



AUS-SPEC

Infrastructure Specifications

1146 Microsurfacing

1146 MICROSURFACING

IMPORTANT: This document has been adapted from the NATSPEC suite of specification templates for use in the Cessnock City Council area by both Council and industry. NATSPEC regularly updates the base templates (currently in April and October each year), and Council may incorporate changes into its version of AUS-SPEC from time to time. To assist in highlighting any changes made by Council to the NATSPEC templates, the following conventions are used.

- See ANNEXURE M at the end of this document which contains (where practical) Cessnock City Council customisations (also known as ‘office master’ text). References to the Annexure are to also be inserted at relevant clauses in the main body of the document.
- Where content is added to the main body of the document, it is to be shown **in brown text like this**.
- Where content is deleted or excluded from the main body of the document, it is to be shown ~~struck through like this~~. Such clauses are to have no effect.

Where there is a conflict between main body text and Cessnock City Council specific clauses, Council’s specific clauses shall prevail.

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide microsurfacing treatment, as documented.

Mix design

Requirement: Provide mix design for microsurfacing treatment to **MATERIALS** and EXECUTION, **MIX DESIGN**.

1.2 CROSS REFERENCES

General

Requirement: This worksection is not a self-contained specification. In addition to the requirements of this worksection, conform to the following:

- 0136 General requirements (Construction).
- 0152 Schedule of rates (Construction).
- 0161 Quality management (Construction).
- 1101 Traffic management.

1.3 STANDARDS

General

Pavement surfacings: To Austroads AP-R569 (2018), Austroads ATS 3450 (2021) and Austroads AGPT03 (2009).

1.4 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- PAFV: Polished aggregate friction value.
- PSD: Particle size distribution.

Definitions

General: For the purposes of this worksection the definitions given in Austroads AP-C87 (2015) and the following apply:

- 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 upon contact with surfaces and when exposed to air.
- Microsurfacing: A bituminous slurry surfacing that contains polymer modified emulsion binder, which is capable of being spread in layers with variable thickness for rut-filling and correction courses, and

for wearing course applications requiring good surface texture. Microsurfacing is cured using a chemically controlled curing process.

- Mix: The proportions of component materials in a quantity of slurry seal or microsurfacing treatment mixture.
 - . Mix design: The designed proportion of component materials comprising the surfacing treatment mixture.
 - . Production mix: Mix produced in the plant and delivered to the site in a workable condition suitable for stockpiling, spreading and compaction.
- Paving unit: A purpose-built continuous flow mixing unit capable of accurately metering each individual component material into a mixer which thoroughly blends these materials to form a homogeneous mixture and transfers the mix into a spreader box for application to the pavement surface.
- Polymer modified emulsion (PME): A bitumen emulsion containing a polymer modifier to assist in the development of early aggregate retention and enhanced performance during service. The polymer modifier may be added prior to, during or post emulsion manufacture to achieve specific performance attributes.
- Polymer modified binder (PMB): Materials added to microsurfacing materials to provide enhanced performance for strength and flexibility properties of the final delivered surfacing. These materials may be such materials as fibres or emerging technologies, and their use and inclusion should be substantiated by laboratory testing for the desired attributes.
- Slurry seal: A thin layer of slurry, usually without a polymer modifier, consisting of a mixture of bitumen emulsion, aggregate, water and additives. Slurry seals are cured through a thermal process.

1.5 TOLERANCES

Finished surface

Finished level: ± 10 mm from design levels.

Finished level adjacent to kerb and/or gutters: 0, +10 mm above design level.

Finished shape: 15 mm maximum deviation from the bottom of a 3 m straightedge placed anywhere on the surface in any direction, assessed within 24 hours of completion of work.

1.6 SUBMISSIONS

Execution details

Storage and handling: Submit the proposed method of material handling and storing including the following:

- Binders: Submit details for preventing contamination of binder by other materials.

Program: Submit a surfacing program including inspection and testing plans 7 days before surfacing.

Production plant control system: Submit details of the production control system to **PRODUCTION MIX, Plant production control**.

Plant and equipment: Submit details of plant and equipment proposed for use in the works.

Paving unit calibration: Submit evidence that the proposed equipment will perform the required work and that all metering devices are accurately calibrated, as follows:

- Individual calibration: Each component material at various settings for the paving unit's metering devices.

Non-conforming trial section: Submit details of changes proposed for the new trial section including the equipment, materials, mix and application rate to rectify non-conformance.

Products and materials

Mix design: Submit details of the following:

- Type and source of constituent materials: Including for aggregates, fillers and binders.
- Proportions of constituent materials used: Including binders, bituminous emulsion content and the residual binder content of the emulsion, adhesion agents and additives).
- The combined aggregate/mineral filler particle size distribution as a single grading (not a range).
- Nominal size of the mix design.
- Application rate (m^3 of mix/ m^2 of road surface) and the corresponding layer thickness.

- Test certificates: Submit evidence of conformance in NATA endorsed reports from a NATA accredited facility for the required test method for each constituent (aggregates/mineral fillers/binders/additives) including the following:
- Aggregates: Quality and grading.
- Blended aggregates: Proportions of the various sizes, including coarse aggregates.
- Trial mix testing results for review and approval.

Tack coat emulsion: Submit a certificate of conformity and details of the storage tank batch.

Records

Daily record sheets: Submit details of the materials applied, at the completion of the works for each day.

Tests

Results: Submit results of testing to **ANNEXURE – MAXIMUM LOT SIZE AND MINIMUM TEST FREQUENCIES** and as follows:

- Mix design: To **SUBMISSIONS, Products and materials**.
- Production mix: Test certificates in NATA endorsed reports from a NATA accredited facility for the required test method verifying conformance to the **Maximum permitted variations from approved mix design table**.
- Texture depth: If required, submit test results after one month of opening up to traffic.

Variations

Approved mix design: Submit details, of proposed changes to the approved mix, including its method of production and constituent material supply source.

1.7 INSPECTIONS

Notice

General: Give notice so that inspection may be made of the following:

- Surface preparation: Completed surface preparation, including repair of surface defects.
- Surfacing trial: Completed trial section.
- Non-conforming trial section: If the original trial section is non-conforming, completed new trial section.
- Spreading: Completed surfacing.
- Non-conforming sections: Completed replacement and rectification of non-conforming sections.

2 MATERIALS

2.1 AGGREGATES

Aggregate properties

Mineral aggregates: To AS 2758.2 (2021) and AS 2758.5 (2020).

Components: Crushed rock or crushed gravel, or a mixture of either and natural sand.

Properties: Clean, dry, hard, angular, durable particles; with uniform grading; free from clay, dirt, organic material or other deleterious matter.

To ensure adequate physical strength and durability characteristics, the aggregate shall be derived from source rock that when crushed meets the requirements set out in **Aggregate properties table** and the **Particle size distribution table**.

Aggregate properties table

Property	Limit	Test method
Degradation factor	50 minimum	AS 1141.25.2 (2003) and AS 1141.25.3 (2003)
Los Angeles value: Slurry seal Microsurfacing	35% maximum 30% maximum	AS 1141.23 (2021)
Polished aggregate friction value (PAFV)	45 minimum or higher value	AS 1141.40 (2017) or AS 1141.41 (2017)
Sand Equivalent (SE):		AS 1289.3.7.1 (2002)

Property	Limit	Test method
Slurry seal Microsurfacing	45% minimum 60% minimum	
Wet Strength	150 kN minimum	AS 1141.22 (2019)
Wet/Dry Strength Variation	30% maximum	AS 1141.22 (2019)

Particle size: Conform to the particle size distribution limits when tested to AS 1141.11.1 (2020) and AS 1141.12 (2015), for aggregates (including mineral filler).

Particle size distribution limits for combined aggregate and filler table

AS sieve size (mm) ^a	Percent (%) passing by mass
Size 4^a	Size 7^a
13.2	100
9.50	100
6.70	100
4.75	90 – 100
2.36	65 – 90
1.18	45 – 70
0.60	30 – 50
0.30	18 – 30
0.15	10 – 21
0.075	5 – 15

a. Nominal sizes:
Size 4 is equivalent to ISSA Type II.
Size 7 is equivalent to ISSA Type III.
Properties and grading values may be adjusted to suit local materials and the site specific performance required.

2.2 MINERAL FILLERS

Properties

Filler composition and materials: To AS 2150 (2020) clause 4.2.

Components: Hydrated lime, flyash, portland cement.

Size: Mineral matter with minimum 85% passing a 0.075 mm sieve.

Properties: Dry and free from lumps, clay, organic matter and any deleterious material to asphalt to AS 2150 (2020).

Flyash: To AS/NZS 3582.1 (2016) and Fine grade to AS/NZS 3582.1 (2016) Table 1.

Quantity of filler added to the mix: Do not vary by more than 1% (by mass) of the total filler content in the approved mix design.

2.3 BINDERS

Properties

Composition: To AS 1160 (1996) clause 6.1.

Bitumen: To AS 2008 (2013) (before emulsification).

Type: Emulsified polymer modified bitumen:

- Polymer content: Minimum 3% solids based on bitumen weight content.
- Softening point of bitumen: Minimum 57°C to AS 2341.18 (2020).

Grade: Select a grade of binder appropriate for the bitumen emulsion required for slurry surfacing and with residual binder softening point higher than 57°C (to the suppliers recommended method).

Tack coat binder

Type: Cationic rapid setting bitumen emulsion.

2.4 WATER

General

Properties: Compatible with the component materials as required to achieve the mix performance.

Requirement: Use clean water, free from harmful amounts of materials such as oil, salt, acid, alkali and organic or vegetable matter. Potable water will not require testing for conformity.

2.5 ADDITIVES

Quantity

Requirement: If required to control curing and flow characteristics of the mix, initially provide the quantity allowed in the approved mix design and adjust to suit changes in temperatures and moisture levels.

Higher performance additives

Requirement: Specify the range of additive levels in the mix design and provide supportive test data. Conform to the **Mix Properties Table** for wear loss, required traffic time, adhesion, and the required excess binder content. Do not use additives without approval.

2.6 TESTING

Sampling and testing of materials

Certificates and test results: Performed by an Accredited Testing Laboratory for the required test method within 24 months of use. Provide test of all tests, measurements, calibrations or inspections on NATA endorsed reports.

Quality

Requirement: Test for all characteristics in conformance with **ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES**.

3 MIX DESIGN AND PRODUCTION

3.1 MIX PERFORMANCE

Bituminous mix

Properties: Provide mix to the **Mix properties table** and as follows:

- That is easy to lay and provides a stable and durable finish.
- Provides asphalt emulsion mix, capable of carrying slow moving traffic (less than 40 km/h), within one hour of application without permanent damage such as rutting or ravelling.

Mix stability: Provide a mix with the following properties:

- Sufficiently stable to prevent premature breaking in the spreader box.
- Is homogenous during and following mixing and spreading.
- Free from excess water or bitumen emulsion to prevent segregation.

Mix properties table

Property	Test method	Value
		Microsurfacing
Wear loss	Austrroads AG:PT/T272: - 1 hour soak - 6 day soak	540 g/m ² maximum ^b 800 g/m ² maximum ^a
Traffic time	Austrroads AGPT/T271 (2018): - 30 minutes - 60 minutes	12 kN.m minimum 20 kN.m minimum
Adhesion	To ISSA TB 114 (2017) wet stripping test	≥ 90%
Consistency	Austrroads AGPT/T270 (2018)	20 mm
Excess binder content (for traffic volume > 3000 v//d)	Austrroads AGPT/T273 (2018)	Not applicable
a. Microsurfacing for traffic volume > 3000 v//d. b. Microsurfacing for traffic volume ≤ 3000 v//d. Note: v//d: vehicles/lane/day.		

3.2 MIX DESIGN

Mix design requirements

General: Design a bituminous mix for the required application that conforms to **MATERIALS** and the following for approval:

- For the designed traffic volume.
- With the sufficient binder for the required mix performance.
- With sufficient workability.
- Meets performance required over the service life of the pavement.

Inclusions: In the design report/submission, determine the following:

- The required performance grade of binder identification.
- Aggregate stockpile selection suitable for use in the volumetric design.
- Binder selection.
- Optimum binder content determination: Through trial mix laboratory testing.

Previously designed mixes: These may be acceptable if conforming to the following requirements:

- **MATERIALS.**
- The work is undertaken within a two year period from the date of testing in the mix design report.
- The type, quality and source of all constituent materials remain unchanged.
- The **Maximum permitted variations from approved mix design table.**

Mix design approval

Trial mix testing: Prepare samples for testing in a laboratory to EXECUTION, **TESTING**, **Sampling** to demonstrate conformance with **MATERIALS**.

Approval procedure: Provide mix design details to **SUBMISSIONS, Products and materials** and trial mix testing results, demonstrating that the mix design conforms to the requirements of this worksection.

Testing: By an Accredited Testing laboratory for the required test method and test results presented in an endorsed test report.

Mix design currency

Period of mix currency: Mix designs may be current for a period of up to two years where no substantial change has occurred for the source and quality of the component materials.

Additives

Requirement: Only use if there is evidence that it has no detrimental effect on the mix performance. If required, include dose rates in the mix design.

3.3 PRODUCTION MIX

Mix properties

Properties: Make sure the mix conforms to the following:

- Can be placed and spread evenly on the road surface.
- Capable of being spread in layers of variable thicknesses for surface correction and for wearing surface applications.
- The sources and quality of the component materials remain unchanged from the approved mix design.
- The proportions of the component materials remain unchanged from the approved mix design.
- The mix continues to perform in service.

Maximum permitted variations from approved mix design table

AS sieve size (mm)/ property	Maximum permitted variations from approved mix design (% by mass)	
	Size 4 ^a	Size 7 ^a
9.50 and larger	Nil	Nil
6.70	Nil	±7
4.75	±7	±7

AS sieve size (mm)/ property	Maximum permitted variations from approved mix design (% by mass)	
	Size 4 ^a	Size 7 ^a
2.36 and 1.18	±5	±5
0.600	±4	±4
0.300	±4	±4
0.150	±2.5	±2.5
0.075	±1.5	±1.5
Residual binder content	-0.5 +1.0	-0.5 +1.0
a. Nominal mix size		

Plant production control

Manufacturer's production control system: Maintain control system so that the surfacing mixture conforms to the required performance.

Production control system components: Establish, document and maintain a system consisting of the following:

- Operational techniques and measures for maintaining and controlling mix requirements.
- Inspection and test regime for incoming materials.
- Records system for product and test traceability, and evidence of compliance including changes to the source of supplies and changes to the proportions of a mix.
- Notification of changes.
- Handling and storage of incoming products and actions required if incoming products do not conform.
- Moisture control and particle grading limits and tolerances for incoming granular materials.
- Mix design methodologies, recording and numbering systems.

Subcontractors: If the constituent materials or the mix has been designed or tested by another supplier or is subcontracted, the manufacturer retains the overall responsibility of the mix.

4 EXECUTION

4.1 CONSTRUCTION PLANT AND EQUIPMENT

Equipment properties

Equipment condition: Maintain all plant and equipment in good working condition at all times.

Paving unit: Use paving units with the following properties:

- Self-propelling.
- Accurately proportioning and delivering constituent material to the mixer.
- Mixing capacity to continuously supply treatment mixture for the works required.
- Sufficient storage capacity for the extent of the works required.
- Capable of individual calibration for the component materials of the mix.

Spreader box: Use paving units with spreader box attached to or forming part of the mixing unit for uniform spread of the mix.

Ancillary equipment: Supply all required ancillary equipment in conformance with statutory requirements including for rotary road brooms, rollers, signs, lamps, barricades, hand squeegees, shovels and hand brooms.

Paving unit calibration

Individual calibration: Calibrate each paving unit with the component materials of the approved mix before the start of spreading.

4.2 SURFACING TRIAL

Trial section construction

Requirement: Before starting normal surfacing, conduct a test run to demonstrate surface texture:

- Length: Minimum 10 m.
 - Width: Same as that documented for the Works.
- Materials and methods: Use the approved materials, mix, equipment and methods.

Trial run

Requirement: Carry out the trial run to demonstrate performance and conformance of the following:

- Method of operation and efficiency of mobile plants.
- Emulsion content and rate of spread.
- The ability of surfacing to carry the required traffic load.
- Material and workmanship, including to the **Surface texture depth requirements for microsurfacing table**.

Surface texture depth requirements for microsurfacing table

Mix size (mm)	Minimum texture depth (mm)	Test method
Size 4	0.4	Austrroads AG:PT/T250 (2008) or approved alternate method
Size 7	0.8	Austrroads AG:PT/T250 (2008) or approved alternate method
Note: A correction course is not considered to be a wearing course for the purposes of this requirement.		

Non-conforming trial section

Requirement: If the trial section is deemed non-conforming, rectify any damage caused by the removal, and construct a new trial section in conformance with **NON-CONFORMANCE**.

4.3 SURFACE PREPARATION**Set-out**

Setting out: Set out works for the required size, thickness, and extent of surfacing,.

Marking intervals: Place marks at maximum 10 m intervals on the line to be followed by the paving unit. Where the line is defined by a kerb or edge, marking is not required.

Edges and joints: Locate parallel to kerbs and shoulders and to prevent run-off of the treatment mixture. Keep lines at intersections straight, use masking if required.

Cleaning

Sweeping surfaces: Before applying mixture, make sure the surface is dry and clear of loose material, stones, dirt, dust and foreign matter. Sweep the surface beyond the edge of the surfacing area by at least 300 mm.

Contaminated areas: Clean areas affected by oil and other contamination.

Vegetative growth: Remove from surface and cracks before applying tack coat.

Existing bituminous surfaces: Remove loose or peeling bitumen.

Protection of services and fixtures adjacent to the surfacing area

Protection: Prevent microsurfacing mixture or other materials used in the surfacing operation from entering or adhering to kerbs, gutters, driveways, gratings, hydrants, valve boxes, manhole covers, bridges, culvert decks or other road fixtures.

Surface defects

Requirement: Repair surface defects including drainage problems, cracks, potholes repairs and failed pavement, if required minimum 3 months before spreading mix.

Minor repairs: Hand place mix to surfacing areas if the use of a paving unit is impracticable.

Cracks: Treat cracks wider than 6.5 mm in the pavement surface with an approved crack sealer before spreading.

Tack coat

Requirement: If surface to be covered is extremely oxidised, ravelled or comprises concrete or brick, apply a tack coat.

Application rate: 0.2 to 0.3 L/m² of residual binder at 15°C.

Break prior to microsurfacing: The tack coat emulsion will be permitted to break prior to microsurfacing.

Water fog coat

Fogging: If required, pre-wet surface ahead of the spreader box so that the entire surface is damp, with no apparent flowing water.

Application rate of fog spray: Adjust to suit the temperature, surface texture, humidity and dryness of the surface being covered.

4.4 SPREADING**Weather and surface conditions**

Weather conditions: Do not apply the mix in the following conditions:

- During periods of rain, snow or sleet.
- When free water, frost, ice or snow is present on the surface.
- When the air/shade temperature is below 8°C or below 10°C on a falling thermometer or when the pavement surface temperature is below 8°C.
- When the air temperature exceeds 40°C.
- Permitted application conditions: Treatment mixture may be applied if both pavement and air temperatures are above 7°C and rising.

If rain is forecasted: Work may proceed but any microsurfacing damaged by rain is to be rectified without incurring extra costs.

Surface pavement condition: If dampening is required, slightly dampen surface by water fogging.

Mix consistency

Consistency: As required to produce a uniform coating when deposited in the spreader box.

Water: Only add minor amounts for overcoming temporary mix build-ups in the corners of the spreader box.

Mixing time and rate

Requirement: Adjust the mixing time and rate to produce a uniform coating and a mixture that can be fed into the moving spreader box at a rate required for maintaining supply across the full width of the strike-off.

Application rate

Requirement: Adjust the strike-off so that the application rate meets the required rate and completely fills the surface voids.

Rolling

Method: Generally rolling is not required. If required, use self-propelling, pneumatic tyred, multi-wheel rollers to produce a dense, even, homogeneous compacted surface

Timing: Carry out rolling after the emulsion has broken, when the mix is sufficiently stable, and has been cured sufficiently to prevent pick-up on the roller tyres and prevent delamination.

Combination treatment

Seal construction: To Austroads AGPT04K (2018) and Austroads AGPT03 (2009).

Timing: Apply spray seal and slurry seal or microsurfacing on the same day.

Sprayed bituminous seal: To *1143 Sprayed bituminous surfacing*.

Protection from traffic: Prevent trafficking of the surface until the surfacing texture has cured.

Traffic time

Open to traffic: To avoid undue permanent damage such as rutting or ravelling open the road surface within 1 hour of spray application. Traffic time varies with temperature. Cooler weather, thicker layers or in shaded areas will extend time delay for traffic.

Surface texture

Properties: Uniform in appearance, and free of areas showing segregation or excessive/ insufficient binder.

Finished surface: Finish work so that the surface texture conforms to the **Surface texture depth requirements for microsurfacing table**.

Surface finish

Unsatisfactory finish: Remove and replace any section of surfacing that is loose, broken or contaminated with dirt.

Texture testing: If surfacing is applied as a wearing course, test texture depth to **TESTING, Completion tests**.

Surface shape

Finished surface or final wearing course: To **TOLERANCES**.

Joints

Longitudinal joints in the wearing course: Place joints straight and within 300 mm of the edge or the centre of a traffic lane. If required, lightly screed the edges and joints with a hand squeegee to achieve a smooth uniform appearance and to remove excess build-up of material.

- Maximum overlap: 200 mm.
- Tolerance: Maximum 6.5 mm elevation along a 3 mm straightedge.

Number of joints: Use spreading equipment that minimises the number of longitudinal joints required for the project.

4.5 REPAIR OF EXISTING BITUMINOUS SURFACING**Rut-filling**

Wheel ruts deeper than 15 mm: Apply a rut-filling course before constructing the wearing course. Use a spreader box capable of laying the bituminous mix across the varying cross-sectional depth to fill ruts.

Multiple layers: Specify the number of layers of rut-filling or correction course along with the maximum thickness of microsurfacing to be applied in each layer. Specify the minimum time delay between each correction course in **Multiple Layer Applications**.

Apply rut-filling courses in layers of 1.5 to 2.0 times the nominal aggregate size. Conform to varying size mixes for correction to the **Rutfilling and shape correction table**.

Shape correction

Requirement: Provide a correction course to produce a suitable and stable finish over ruts in excess of 10 mm deep. Apply correction courses using a stiff strike-off screed on a standard spreader box for shallow ruts and a purpose-built rut-filling spreader box for ruts in excess of 10 mm deep. For ruts in excess of 40 mm, use asphalt for shape correction.

Multiple layer applications

Multiple layers: Sufficient time is required to achieve final cure. Delay at least 1 hour between layers to permit moisture evaporation escape for low volume roads. For heavy traffic locations or deep rutting allow 24 hours between layers to achieve stronger surfacing and ensure moisture evaporation from the thicker layers.

Rut-filling and shape correction table

Nominal Size	Size 4 mm	Size 7 mm
Void filling e.g. Cape seals	√	
For rutting 10 to 15 mm deep	√	√
For rutting 15 to 25 mm deep		√ (see note below)
For rutting 25 to 40 mm deep		√ (see note below)
Note: Apply correction in multiple layers is suggested where the depth of a rut exceeds 2 to 2.5 times the nominal maximum aggregate size of the mix		

Textured surface: To obtain an even and uniformly textured surface, overlay rut filling and correction courses by a wearing course. If this is not done, the coarser aggregate fractions will settle into the mix resulting in a low or uneven surface texture and an unsightly appearance due to fatty spots.

4.6 CLEANING**Completion of spreading**

Requirement: After bituminous mix spreading, remove excess materials from kerbs, gutters, driveways, gratings, hydrants, valve boxes, access chamber covers and other road fixtures. Leave these areas in a clean condition.

4.7 NON-CONFORMANCE**Materials and finished surfacing**

Rectification: Rectify non-conforming work including the following:

- Materials supplied.
- Sections of slurry seal and/or microsurfacing treatments

- Materials made defective by the method of operation adopted.
- Texture depth.

Non-conforming sections: Replace and restore any underlying or adjacent surface/or structure.

4.8 TESTING

Sampling

Requirement: Prepare samples to Austroads AGPT/T221 (2018) for testing as follows:

- Drying: Before testing for residual binder content and aggregate gradation, dry the samples to a constant weight in an oven at 60°C for minimum 15 hours.
- Tack coat: Take two 2 L samples of bitumen emulsion from each bulk delivery.

Quality

Requirement: Test for all characteristics in conformance with **ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES**.

Completion tests

Texture depth: One month after opening the completed surfacing to traffic, test for texture depth follows:

- Visual assessment. See IPWEA PN09 and VicRoads Technical Bulletin 50 for guidance on visual assessments.
- If visual assessment is not conclusive, carry out sand patch testing to Austroads AG:PT/T250 (2008).

4.9 PROTECTION

Surface protection

Protection from traffic: Do not allow traffic on the new work until:

- The surface is stable and able to withstand traffic without damage.
- Sufficient rolling has taken place to prevent damaging the freshly applied surfacing treatment.

Roadwork signs: Leave in place until the surfacing application is complete and stable, and linemarkings reinstated.

5 ANNEXURE A

5.1 ANNEXURE – SELECTIONS

This Annexure should be completed for Council or private development projects to specify parameters required in conjunction with the contract Drawings. Where there is an inconsistency between the approved Drawings and this Annexure, the approved Drawings shall prevail unless specifically noted otherwise.

Microsurfacing treatment requirements schedule

Course	Nominal size	Average layer thickness (mm)	Minimum PAFV
Wearing			
Rut-filling			
Regulating			
Other			

Skid resistance requirements schedule

Mix size (mm)	Skid resistance	Test method ^a
Size 4		
Size 7		

a. Allow for SCRIM or GripTester as appropriate for the project location.

Note: See Austroads AP-T177 for guidance on skid resistance and measurement methods.

5.2 ANNEXURE - SUMMARY OF HOLD AND WITNESS POINTS

For private developments, certain Hold and Witness Points where specifically noted below require representatives of both the Superintendent and the Principal Certifier (e.g. Council) to authorise release.

Clause and description	Type	Submission/Inspection details	Submission/Notice times	Process held
SUBMISSIONS, Products and materials Mix design – Type and source of constituent materials; Test certificates	H	Documentation on material type, source and test certificates as evidence of conformance for each constituent.	10 days before starting production mix	Production of mix
SUBMISSIONS, Products and materials Mix design	H – Superintendent and Principal Certifier	Samples, documentation and test certificates verifying the mix design meets the project requirements.	10 days before starting production mix	Production of mix
SUBMISSIONS, Execution details Plant and equipment	H	Details of plant and equipment.	14 days before spreading/surfacing trial run	Spreading/trial section
INSPECTIONS, Notice Surface preparation	H – Superintendent and Principal Certifier	Completed surface preparation, including repair of surface defects.	7 days before spreading/surfacing trial run	Spreading/trial section
SUBMISSIONS, Execution details Paving unit calibration	H	Evidence of paving unit calibration.	1 day before spreading/surfacing trial run	Spreading/trial section
INSPECTIONS, Notice Surfacing trial	H	Completed trial section.	5 days before normal surfacing	Acceptance of trial run
SUBMISSIONS, Execution details Non-conforming trial section	H	Details of proposed changes to the trial section.	1 day after non-conformance has been identified	Spreading
INSPECTIONS, Notice Non-conforming trial section	H	Completed new trial section.	1 day before the inspection	Spreading
INSPECTIONS, Notice Spreading	H – Superintendent and Principal Certifier	Completed surfacing.	2 days after spreading	The next lot or application of pavement marking
INSPECTIONS, Notice Non-conforming	W	Completed replacement and rectification of non-conforming sections.	1 day before the inspection	Linemarking application and opening to traffic

Clause and description	Type	Submission/Inspection details	Submission/Notice times	Process held
sections				
Note: H = Hold Point, W = Witness Point				

5.3 ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES

Activity	Key quality verification requirements	Maximum lot size	Minimum test frequency	Test method
Binders	Content	1 contract	1 per type	AS/NZS 2891.3.1 (2013)
Aggregates	Grading	1 contract	1 per type	AS/NZS 2891.3.1 (2013)
	Degradation factor	1 contract	1 per type	AS 1141.25.1 (2003)
	Los Angeles value	1 contract	1 per type	AS 1141.23 (2021)
	Wet strength	1 contract	1 per type	AS 1141.22 (2019)
	Wet/dry strength variation	1 contract	1 per type	AS 1141.22 (2019)
	Polished aggregate friction value	1 contract	1 per type	AS 1141.42 (2017)
	Sand equivalent	1 contract	1 per type	AS 1289.3.7.1 (2002)
	Grading limits	1 contract	1 per type	AS 1141.11.1 (2020) and AS 1141.12 (2015)
Mineral filler	Portland cement	1 contract	1 per type	AS 2350 (various)
Tack coat	Residual binder content	1 contract	Each delivery of emulsion	AS 1160 (1996)
	Bitumen emulsion samples for testing	1 contract	1 per type	AS 1160 (1996)
Bituminous mix	Sampling	50 m ³ or one days' production or smaller quantities considered as representative of the consistent production of the paving unit	Take 1.0 kg representative samples from each lot	Austrroads AGPT/T221 (2018)
Completion tests	Texture depth	1 contract	4 tests per lot	Austrroads AG:PT/T250 (2008)

Activity	Material	Key quality verification requirements	Maximum lot size	Minimum test frequency	Test method/ Conformance assessment
Materials supply		Material quality – supplier's documentary evidence and certification of:			
	Bitumen	Material properties before emulsion	1 contract	1 per contract or change in	AS 2008 (2013)

Activity	Material	Key quality verification requirements	Maximum lot size	Minimum test frequency	Test method/ Conformance assessment
				material	
	Bitumen emulsion	Residual binder content (residue from evaporation)	1 contract	2 per bulk delivery	AS/NZS 2891.3.1 (2013)
		Softening point of residual binder			AS 2341.18 (2020)
	Mineral aggregates	Degradation factor	1 contract	1 per contract or 6 month period	AS 1141.25.1 (2003)
		Los Angeles value	1 contract	1 per contract or 6 month period	AS 1141.23 (2021)
		Aggregate wet strength	1 contract	1 per contract or 6 month period	AS 1141.22 (2019)
		Wet/dry strength variation	1 contract	1 per contract or 6 month period	AS 1141.22 (2019)
		Polished aggregate friction value	1 contract	1 per contract or 6 month period	AS 1141.42 (2017)
		Sand equivalent	1 contract	1 per contract or 6 month period	AS 1289.3.7.1 (2002)
		Combined aggregate grading	1 contract	1 per contract or 6 month period	AS/NZS 2891.3.1 (2013)
		Grading limits	1 contract	1 per contract or 6 month period	AS 1141.11.1 (2020) and AS 1141.12 (2015)
	Mineral filler	Material properties	1 month's production	1 per contract or 6 month period	AS 3972 (2010), AS 1672.1 (1997) or AS/NZS 3582.1 (2016)
Mix design	All constituent materials	Approval of mix and NATA endorsed certification – supplier's documentary evidence and certification	1 contract	1 per mix	MATERIALS
Mix properties		Wear loss	1 contract	1 per mix	Austrroads AGPT/T272 (2018)
		Traffic time	1 contract	1 per mix	Austrroads AGPT/T271 (2018)
		Adhesion	1 contract	1 per mix	ISSA TB 114 (2017) or Shulz

Activity	Material	Key quality verification requirements	Maximum lot size	Minimum test frequency	Test method/ Conformance assessment
					Breuer and Ruck test
		Consistency	1 contract	1 per mix	Austrroads AGPT/T270 (2018)
Production mix		Grading	1 day's production or 50 m ³ (whichever is the lesser)	2 per 50 m ^{3a}	AS/NZS 2891.3.1 (2013)
		Residual binder content		2 per 50 m ^{3a}	AS/NZS 2891.3.1 (2013)
Spreading	Surface finish	Levels	1 layer, max. 200 m ³	1 cross section per 15 m	Survey
		Surface quality – texture depth		10 per 100 m lane length ^a	Visual assessment or Austrroads AG:PT/T250 (2008)
a. or part thereof per lot.					

5.4 ANNEXURE - PAY ITEMS

This schedule applies to Council projects. For private development works use of this schedule is optional, at the Superintendent's discretion.

Pay items	Unit of measurement	Schedule rate inclusions
1146.1 Surface preparation and tack bitumen coat	Per m ² area including bitumen tack coat.	All costs associated with surface preparation, set out, cleaning, protection of services, tack coat supply and spray, and other preparation items
1146.2 Correction of rutting prior to placement area	Per m ³ volume of dry mineral aggregate combined with binder mix.	Calculate the volume based on the width and length of the rutting to be corrected and the average depth of the rutting taken as half of the maximum rut depth obtained from network data. Quantities calculated can be verified against quantities of aggregate and bitumen supplied to the job by the contractor.
1146.3 Size 4 surfacing mix microsurfacing	m ³ of the combined mix as applied on the road surface. The volume of the combined mix is the volume of the dry mineral aggregate (excluding filler) used in completing the works recorded by the paving unit.	All costs associated with preparation of the surface, mix design, all sampling and testing, supply of all materials to site, and loading, mixing and spreading the bituminous surfacing mix including finishing, joint treatment and clean-up.
1146.4 Size 7 surfacing mix microsurfacing	m ³ of the combined mix as spread on the road surface. The volume of the combined mix is the volume of the dry mineral aggregate (excluding filler) used in completing the works recorded by the paving unit.	All costs associated with preparation of the surface, mix design, all sampling and testing, supply of all materials to site, and loading, mixing and spreading the bituminous surfacing mix including finishing, joint treatment and clean-up.
Traffic management	Lump sum.	To 1101 Traffic management.

5.5 ANNEXURE - REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1141		Methods for sampling and testing aggregates
AS 1141.11.1	2020	Particle size distribution - Sieving method
AS 1141.12	2015	Materials finer than 75 µm in aggregates (by washing)
AS 1141.22	2019	Wet/dry strength variation
AS 1141.23	2021	Los Angeles value
AS 1141.25.1	2003	Degradation factor - Source rock
AS 1141.25.2	2003	Degradation factor - Coarse aggregate
AS 1141.25.3	2003	Degradation factor - Fine aggregate
AS 1141.40	2017	Polished aggregate friction value - Vertical road-wheel machine
AS 1141.41	2017	Polished aggregate friction value - Horizontal bed machine
AS 1141.42	2017	Pendulum friction test
AS 1160	1996	Bitumen emulsions for the construction and maintenance of pavements
AS 1289		Methods of testing soils for engineering purposes
AS 1289.3.7.1	2002	Soil classification tests - Determination of the sand equivalent of a soil using a power-operated shaker
AS 1672		Limes and limestones
AS 1672.1	1997	Limes for building
AS 2008	2013	Bitumen for pavements
AS 2150	2020	Asphalt - A guide to good practice
AS 2341		Methods of testing bitumen and related roadmaking products
AS 2341.18	2020	Determination of softening point (ring and ball method)
AS 2350		Methods of testing portland, blended and masonry cements
AS 2758		Aggregates and rock for engineering purposes
AS 2758.2	2021	Specification for sealing aggregate
AS 2758.5	2020	Specification for aggregates for asphalt
AS/NZS 2891		Methods of sampling and testing asphalt
AS/NZS 2891.3.1	2013	Binder content and aggregate grading - Reflux method
AS/NZS 3582		Supplementary cementitious materials
AS/NZS 3582.1	2016	Fly ash
AS 3972	2010	General purpose and blended cements
Austrroads AGPT		Guide to pavement technology
Austrroads AGPT03	2009	Pavement surfacings
Austrroads AGPT04K	2018	Selection and design of sprayed seal
Austrroads AGPT/T221	2018	Sampling of bituminous slurry
Austrroads AG:PT/T250	2008	Modified surface texture depth (Pestle method)
Austrroads AGPT/T270	2018	Determination of optimum amount of added water for bituminous slurry (consistency test)
Austrroads AGPT/T271	2018	Determination of set and cure for bituminous slurry (cohesion test)
Austrroads AGPT/T272	2018	Determination of abrasion loss of bituminous slurry (wet track abrasion test)
Austrroads AGPT/T273	2018	Determination of excess binder in bituminous slurry (loaded wheel test)
Austrroads AP-C87	2015	Austrroads glossary of terms
Austrroads AP-R569	2018	Guidelines and specification for microsurfacing
Austrroads ATS		Austrroads technical specifications
Austrroads ATS 3450	2021	Microsurfacing
ISSA TB 114	2017	Test method for wet stripping of cured slurry surfacing mixture

6 ANNEXURE M – CESSNOCK CITY COUNCIL SPECIFIC CLAUSES

M1.	Variations to or non-conformances with Council's AUS-SPEC are to be evaluated with reference to the procedure in Council's <i>Development Engineering Handbook</i> . Acceptance is to be obtained in writing from: an authorised representative of Council's Director of Infrastructure and Engineering Services.	Variation procedure
M2.	This specification applies in addition to any development consent (DA) conditions. If there is any inconsistency, the conditions of consent shall prevail.	DA Conditions
M3.	Refer to the Cessnock City Council <i>Development Engineering Handbook</i> for final inspection, works-as-executed and handover requirements.	Completion

7 AMENDMENT HISTORY

0	15/01/2024	First Published
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