DELIVERING FOR QUEENSLAND

Technical Specification

Transport and Main Roads Specifications MRTS13 Microsurfacing

November 2025

(ATS 3450 Microsurfacing, Ed 1.2 January 2023)

Queensland Government

Copyright

Licence

CC BY licence summary statement

Translating and interpreting assistance

The Queensland Government is committed to providing accessible services to Queenslanders from all cultural and linguistic backgrounds. If you have difficulty understanding this publication and need a translator, please call the Translating and Interpreting Service (TIS National) on 13 14 50 and ask them to telephone the Queensland Department of Transport and Main Roads on 13 74 68.

Disclaimer

While every care has been taken in preparing this publication, the State of Queensland accepts no responsibility for decisions or actions taken as a result of any data, information, statement or advice, expressed or implied, contained within. To the best of our knowledge, the content was correct at the time of publishing.

Feedback

Please send your feedback regarding this document to: tmr.techdocs@tmr.qld.gov.au

Purpose

This ancillary document outlines the adopted national Austroads Technical Specification ATS 3450 *Microsurfacing* and modified Queensland-specific content with tracked changes.

The following table summarises the relationship between the Austroads Technical Specification ATS 3450 *Microsurfacing* and this document:

Type of Content	Display
National content adopted	National content adopted
National content not adopted	~~National content not adopted~~
Queensland-specific content	Queensland-specific content

About this document

The document adopts and modifies Austroads Technical Specification ATS 3450 *Microsurfacing* as part of national harmonisation. It sets out the requirements for the supply and placement of microsurfacings.

How to use this document

This document includes the national guidance and Queensland-specific advice while following the structure established in Austroads Technical Specifications.

Queensland-specific advice includes practices which vary from national practice because of local environmental conditions (such as geography, soil types, climate); different funding practices; local research; local legislation requirements; and to expand instruction on particular issues.

This document:

- sets out how the Austroads Technical Specification ATS 3450 *Microsurfacing* applies in Queensland
- has precedence over the Austroads Technical Specification ATS 3450 *Microsurfacing* when applied in Queensland
- has the same clause numbering and headings as the Austroads Technical Specification ATS 3450 *Microsurfacing*.

Transport and Mains Roads provides an ancillary document which outlines adopted national and modified Queensland-specific content with tracked changes. To access a copy click on the below link: Ancillary documents for harmonised Technical Specifications.

Terminology

The following general amended definitions apply when reading this document.

Reference to...	Means
Shall	Denotes mandatory requirements.
Must	Denotes mandatory requirements.
Principal	The State of Queensland acting through the Department of Transport and Main Roads.
Administrator	The Administrator will be responsible for the overall administration of this Contract.

Contents

1 Scope

1.1 ~~Austroads~~ This Technical Specification ~~ATS 3450~~ sets out the requirements for the manufacture and placement of microsurfacing for use on road pavements and includes requirements for the following:

a) component materials

b) properties of the microsurfacing

c) mix design responsibility

d) manufacturing and application

e) sampling and testing.

This Technical Specification replaces the MRTS13 *Bituminous Slurry Surfacing* Technical Specification published in November 2018 and earlier versions of it. These older Technical Specifications used the term 'slurry seals' or 'slurry surfacings'. Transport and Main Roads is now adopting the more specific term of 'microsufacings' which relates to particular products that include polymer modified emulsions.

1.2 This Technical Specification shall be read in conjunction with MRTS01 *Introduction to Technical Specifications*, MRTS50 *Specific Quality System Requirements* and other Technical Specifications as appropriate.

1.3 This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

2 Referenced documents

2.1 ~~The following documents are referenced in this Specification.~~The requirements of the referenced documents listed in Table 2.1 below apply to this Technical Specification. Where there are inconsistencies between this Technical Specification and the referenced documents, the requirements in this Technical Specification shall take precedence.

Table 2.1 – Reference documents

Reference	Title
Australian / New Zealand Standards	
AS 1141.11.1	*Methods for sampling and testing aggregates: particle size distribution: sieving method*
AS 1141.12	*Methods for sampling and testing aggregates: material finer than 75 µm in aggregates (by washing)*
AS 1141.22	*Methods for sampling and testing aggregates: wet/dry strength variation*
AS 1141.23	*Methods for sampling and testing aggregates: Los Angeles value*
~~AS 1141.25.2~~	~~*Methods for sampling and testing aggregates: degradation factor: coarse aggregate*~~
AS 1141.25.3	*Methods for sampling and testing aggregates: degradation factor: fine aggregate*
AS 1141.3.1	*Methods for sampling and testing aggregates: sampling: aggregates*
AS 1141.40	*Methods for sampling and testing aggregates: polished aggregate friction value: vertical road-wheel machine*
~~AS 1141.41~~	~~*Methods for sampling and testing aggregates: polished aggregate friction value: horizontal bed machine*~~
AS 1141.42	*Methods for sampling and testing aggregates: pendulum friction test*
AS 1160	*Bitumen emulsions for construction and maintenance of pavements*
AS 1289.3.7.1	*Methods of testing soils for engineering purposes: soil classification tests: determination of the sand equivalent of a soil using a power operated shaker*
AS 2008	*Bitumen for pavements*
AS 2150	*Hot mix asphalt: a guide to good practice*
AS 2341.18	*Methods of testing bituminous and related roadmaking products: determination of softening point (ring and ball method)*
~~AS 3582.1~~	~~*Supplementary cementitious materials for use with portland and blended cements – Fly ash*~~
AS/NZS 2341.23	*Methods of testing bitumen and related roadmaking products: determination of residue from evaporation*
AS/NZS 2891.3.1	*Methods of sampling and testing asphalt binder content and aggregate grading: reflux method*
AS/NZS 2891.3.2	*Methods of sampling and testing asphalt binder content and aggregate grading: centrifugal extraction method*

Reference	Title
~~AS/NZS 2891.3.3~~	~~*Methods of sampling and testing asphalt binder content and aggregate grading: pressure filter methods*~~
Austroads	
AGPT T221	*Sampling of Bituminous Slurry*
AGPT T234	*Asphalt Binder Content (Ignition Oven Method)*
AGPT T250	*Modified Surface Texture Depth (Pestle method)*
AGPT T270	*Determination of Optimum Amount of Added Water for Bituminous Slurry (Consistency Test)*
AGPT T271	*Determination of Set and Cure for Bituminous Slurry (Cohesion Test)*
AGPT T272	*Determination of Abrasion Loss of Bituminous Slurry (Wet Track Abrasion Test)*
AGPT T273	*Determination of Excess Binder in Bituminous Slurry (Loaded Wheel Test)*
AP-C87-15	*Austroads Glossary of Terms*
AP-R569-18	*Guidelines and Specifications for Microsurfacing*~~[1]~~[(1)]
ATM 453	*Surface Deviation Using a Straightedge*
International Slurry Surfacing Association Standards	
ISSA TB-114	*Technical Bulletin No. 114 Test Method for* Wet Stripping ~~*test for*~~ *of* Cured Slurry ~~*seal mix*~~*Surfacing Mixtures*
Transport and Main Roads Technical Documents	
MRTS01	*Introduction to Technical Specifications*
MRTS21	*Bituminous Emulsion*
MRTS50	*Specific Quality System Requirements*
MRTS103	*Fillers for Asphalt*
Q188	*Petrographic assessment of aggregates*
Q208B	*Degradation factor*

Note:

[(1)] For information only. This publication does not form part of the Contract or this Technical Specification.

~~[1] For information only. This publication does not form part of the Contract.~~

3 Definitions

3.1 ~~In addition to the definitions in AP-C87-15, the following definitions apply to this Specification~~The terms used in this Technical Specification shall be defined in Clause 2 of MRTS01 *Introduction to Technical Specifications*. Additionally terminology relevant to this Technical Specification is defined in Table 3.1 below.

Table 3.1 – Definitions of terms

Term	Definition
Bituminous emulsion	A system of fine droplets of bitumen with or without polymer, suspended in a mixture of water and emulsifier which begins to break on contact with surfaces and when exposed to air.
Microsurfacing	A bituminous slurry surfacing that contains polymer modified emulsion binder, that 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.
Polymer modified emulsion (PME)	A bituminous emulsion containing a polymer additive to assist in the development of early aggregate retention and enhanced binder and surfacing properties. The polymer additive may be added prior to, during or post emulsion manufacture to achieve specified performance attributes.
~~Principal's Registration Scheme~~	~~Any scheme for the prequalification, registration or approval of products, manufacturers and/or suppliers in operation in the jurisdiction where the microsurfacing is to be placed.~~
Asphalt Mix Design Registrar	Person(s) nominated by the Deputy Chief Engineer (Pavements, Materials and Geotechnical) to register asphalt and microsurfacing mix designs for use on Department of Transport and Main Roads projects.
Quarry Registration System (QRS)	Quarry Registration System as defined in MRTS50 *Specific Quality System Requirements*.

4 Quality system requirements

4.1 The Contractor must prepare and implement a Quality Plan that includes the documentation in Table 4.1.

Table 4.1 – Quality Plan

Clause	Description of Document
4.2	Quarry Registration Certificate, including its testing frequency schedule, that has been issued by Transport and Main Roads to the quarry that will supply aggregate for use in mircrosurfacing.
4.3	Aggregate production procedure.
~~6~~	~~Details of the proposed materials and evidence that the materials comply with the requirements of this Specification, including:~~ ~~a) details of the source of the aggregate, including evidence of that the aggregate is currently approved or registered where required under a Principal's Registration Scheme~~ ~~b) aggregate properties~~ ~~c) aggregate particle size distribution~~ ~~d) details of the filler~~ ~~e) details of the additives~~ ~~f) binder properties~~ ~~g) details of water, and~~ h) ~~additive properties.~~
7.3	~~If the proposed~~ Mix Design certificate(s) for the Transport and Main Roads registered mix designs to be used for the work.~~has been approved or registered by the Principal in the preceding 3 years, the approval / registration details are to be submitted.~~ ~~Otherwise, the proposed Mix Design and supporting information is to be submitted.~~
8.1	Details of the plant to be used, including: a) evidence that the equipment will perform the work as specified, and b) evidence that all metering devices are accurately calibrated.
8.4	Procedure for the calibration of the paving unit and the component metering devices.
9	Work method statements / procedures for the production, spreading and rolling (if required in accordance with Clause 9.2~~7~~6) of the microsurfacing and proposed location of the joints (refer AP-R569-18).
9.1	Location and details of the placement trial (if a trial is specified).
10	Inspection and Test Plan.

4.2 The aggregate ~~If a quarry registration or prequalification scheme for quarry products operates in the jurisdiction where the microsurfacing is to be placed, the coarse and fine aggregate (other than natural sand)~~ must be supplied by a quarry registered ~~or prequalified under that scheme~~to supply aggregate for use in microsurfacing in accordance with Transport and Main Roads Quarry Registration System (QRS). A copy of ~~T~~the current Transport and Main Roads Quarry Registration ~~/ Prequalification~~ Certificate (issued as part of department's QRS), including its Testing Frequency Schedule ~~(if applicable)~~, must be included in the Quality Plan.

4.3 For each quarry that will supply material(s) to be used in the Works, the Contractor shall prepare a construction procedure for aggregate production in accordance with Clause 6 of MRTS50 Specific Quality System Requirements and detail the following for each nominated material in the Quality Plan:

a) area of the quarry from which the material in the lot will be won

b) production process and methods of winning the material

c) procedures for stockpile management and traceability as part of lot control and, as applicable, stockpile sublot control, and

d) quality control procedures. **Hold Point 1** **Record**

HOLD POINT 1	
Process Held	Commencement of microsurfacing.
Submission Details	The Quality Plan (as per Clause 4.1) must be provided to the ~~Principal~~ Administrator at least 10 working days prior to the commencement of work on site.

5 Program of work

5.1 Unless specified otherwise in the General Conditions of Contract, the Contractor must provide an overall program of work to the Administrator at least 2 weeks prior to the commencement of the microsurfacing works under this contract.

5.2 While the microsurfacing work is underway, the Contractor must:

a) prepare a weekly update of the program and provide it to the ~~Principal~~ Administrator prior to the Thursday preceding the execution of the work in the following week, and

b) provide at least 2 weeks prior notice of any significant changes to the overall program that was submitted in accordance with Clause 5.1. **Hold Point 2 Record**

HOLD POINT 2 – Clauses 5.1 and 5.2	
Process Held	Commencement or continuation of microsurfacing work.
Submission Details	The overall program of microsurfacing work and weekly updates must be provided in accordance with the Clauses 5.1 and 5.2.

5.3 The specific microsurfacing treatments to be installed under this Contract shall be as stated in Clause 1 of Annexure MRTS13.1.

6 Materials

Mineral aggregate

6.1 Mineral aggregate must consist of crushed rock or crushed gravel and may include proportions of natural sand particles.

6.2 The aggregate must be clean, hard, angular, durable and free from clay and other aggregations of fine material, soil, organic material or other deleterious material.

6.3 The aggregate must be manufactured from source rock that when crushed meets the requirements set out in Table 6.3.

Table 6.3 – Aggregate properties

Property	Limit	Test Method
Petrographic analysis	Interpretative report	Q188
Degradation factor	50 minimum	~~AS 1141.25.2~~Q208B and AS 1141.25.3
Los Angeles value	30% maximum	AS 1141.23
Wet strength	150 kN minimum	AS 1141.22
Wet/dry strength variation	30% maximum	AS 1141.22

Property	Limit	Test Method
Polished aggregate friction value	45 minimum~~(1)~~	AS 1141.40 ~~or~~ ~~AS 1141.41~~ and AS 1141.42
Sand equivalent	60% minimum	AS 1289.3.7.1

~~Note:~~

~~(1) Unless a higher value is specified in the Contract documents.~~

6.4 When tested in accordance with AS 1141.11.1 and AS 1141.12, the aggregate (including mineral filler) must conform to the particle size distribution limits shown in Table 6.4.

Table 6.4 – Particle size distribution limits for combined aggregate and mineral filler

Sieve size (mm)	Percent passing by mass			
	Size 4	Size 5	Size 7	Size 10
13.2	100	100	100	100
9.50	100	100	100	95–100
6.70	100	100	85–100	85–90
4.75	90–100	90–100	70–90	60–85
2.36	65–90	50–70	45–70	40–60
1.18	45–70	30–50	28–50	28–45
0.6	30–50	20–35	19–34	19–34
0.3	18–30	12–25	12–25	12–25
0.15	10–21	7–18	7–18	7–18
0.075	5–15	4–10	5–15	4–8

Mineral filler

6.5 Mineral filler must consist of an approved material such as Portland cement, hydrated lime or flyash with a minimum of 85% passing a 75µm sieve.

6.6 The mineral filler must be dry, free from lumps, clay, organic material and any other deleterious material and must comply in all other respects with the requirements of ~~AS 2150~~MRTS103 *Fillers of Asphalt*. Flyash must comply with AS 3582.1 and be '~~fine grade~~Grade 1' in Table 1 of AS 3582.1.

6.7 The quantity of mineral filler added to the mixed materials during placement must not vary by more than 1.0 Percentage Points[2] from the target mineral filler amount prescribed in the mix design.

Binder

6.8 Bituminous emulsions used in this process are typically proprietary grades with polymer modification so that the mix design meets the performance requirements specified in Table 7.2. Bitumen used in emulsion manufacture must comply with requirements of AS 2008.

6.9 The softening point, determined in accordance with AS 2341.18, of binder recovered from the bituminous emulsion must be a minimum of 57°C. The binder must be extracted from the bituminous emulsion in accordance with the bituminous emulsion supplier's recommended method.

Water

6.10 Water added to the mixture must be compatible with the component materials such that the performance requirements specified in Table 7.2 are met.

Additives

6.11 Additives may be incorporated and nominated in a mix design provided the property limits shown in Table 7.2 are met at both extremes of the nominated additive dosage range.

6.12 The range of additive levels to be used must be stated in the mix design.

7 Mix Design

Responsibility for Mix Design

7.1 The Contractor is responsible for the design of the microsurfacing.

[2] A 'Percentage Point' is the numerical difference between two percentages. For example, a change in the mineral filler content from 3% to 4% is a change of 1.0 Percentage Points.

Mix Design criteria

7.2 The component materials must be proportioned such that the Consistency of the bituminous mixture meets the requirements of test method AGPT-T270. The mix design must also conform to the properties shown in Table 7.2.

Table 7.2 – Mix properties

Property	Test method	Limits
Wear loss	~~AGPT -T272~~	
	AGPT -T272~~1 hour soak~~	540 g/m² maximum for 1 hour soak
	~~6 days soak~~	800 g/m² maximum for 6 days soak
Traffic time	~~AGPT -T271~~	
	AGPT -T271~~30 minutes~~	1.2 N.m minimum at 30 minutes
	~~60 minutes~~	2.0 N.m minimum at 60 minutes
Adhesion	ISSA TB 114	≥ 90%
Excess binder content	AGPT -T273	540 g/m² maximum

Mix Design submission

7.3 A copy of the Contractor's Mix Design certificate for each nominal size mix to be used in the works must be included in the Quality Plan.~~Unless the Contractor proposes to use a Mix Design which has been approved or registered by the Principal in the preceding 3 years, the Contractor's Mix Design must be included in the Quality Plan. The Mix Design must include:~~

~~a)~~ ~~A statement detailing:~~

~~i.~~ ~~the nominal size of the mix design~~

~~ii.~~ ~~the aggregate source, the properties of the mineral aggregate and the combined aggregate/mineral filler particle size distribution~~

~~iii.~~ ~~bituminous emulsion type and residual binder content of the mix design~~

~~iv.~~ ~~the residual binder content of the emulsion with binder properties (refer Clause 6.9)~~

~~v. the intended proportion of each component material, and~~

~~vi. the manufacturer's instructions (where appropriate).~~

~~b) NATA endorsed test reports demonstrating that submitted mix design complies with Table 7.2.~~

It is recommended that mix design(s) are submitted to Transport and Main Road's Asphalt Mix Design Registrar for registration not less than 28 days prior to the microsurfacing being incorporated into the Works. This will allow sufficient time for review and resubmission of the mix design (if required) without the Works being delayed.

The department maintains a Mix Design register on its website. Administrators can check the currency of a mix design certificate using this register. For recently submitted mix designs, the Administrator should check their registration status with the department's Asphalt Mix Design Registrar by sending an email to asphaltmixdesign@tmr.qld.gov.au.

7.4 The proportions of the constituent materials in the Mix Design must be expressed in accordance with AGPT-T270-18.

7.5 The ~~approval or~~ registration of a mix design only confirms that the mix complies with the test criteria. It does not relieve the Contractor of the responsibility of supply~~ing~~ and placing materials which meet the compliance criteria as set out in Clause 10.

7.6 ~~If the results of all tests submitted comply with the specified requirements,~~ The registered ~~the~~ mix design to be used in the works is termed the Job Mix design. The combined aggregate / mineral filler particle size distribution and the binder content, of the Job Mix design are termed the Job Mix particle size distribution and the Job Mix binder content, respectively.

7.7 The Contractor's Job Mix design will be deemed to be current for a period of 3 years from the date of registration ~~/ approval~~, subject to the following:

a) The sources and quality of the component materials in the Job Mix design remain unchanged from the approved mix design.

b) The proportions of the component materials in the Job Mix design remain unchanged from the approved mix design.

c) The mix continues to demonstrate satisfactory performance in service.

~~7.8 All test results included as part of the mix design submission must not be more than 12 months old at the time of submission.~~

8 Plant

Provision of plant and equipment

8.1 The Quality Plan must include:

a) details of proposed plant and equipment and evidence that it has the capability to perform the work in accordance with this Technical Specification, and

b) certificates of calibration for each metering device will not be older than 12 months at the proposed date of commencement of work on site.

8.2 All plant and equipment used in the performance of this work must be in good working condition. If the Contractor proposes to change the plant and equipment from that nominated in the Quality Plan, it must resubmit the information specified in Clause 4.1 and Hold Point 1 will reapply.

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

Paving unit calibration

8.4 The Quality Plan must include a procedure for the calibration of the paving unit and the component metering devices.

8.5 Each paving unit to be used to perform the work must be calibrated with the component materials of the approved mix design prior to the commencement of construction. The certificate of calibration must not be more than 12 months old. The documentation must 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 must be allowed to incorporate mix into the work until the calibration has been completed and/or accepted by the Principal. **Hold Point 3** **Record**

HOLD POINT 3 – Clauses 8.4 and 8.5	
Process Held	Operation using the paving unit.
Submission Details	If not provided with the Quality Plan, the paving unit calibration documentation with component materials of approved mix design must be provided to the ~~Principal~~ Administrator at least one day prior to the commencement of the micro surfacing work.

9 Field application

Placement trial

9.1 If specified in ~~the Contract documents~~Clause 2 of Annexure MRTS13.1, the Contractor must undertake a placement trial prior to commencing work. ~~If specified in the Contract documents, t~~The trial must use the mix, plant and personnel proposed to be used for the Works. If directed by the ~~Principal~~Administrator, a separate placement trial must be undertaken for each additional nominated mix design to be used on the Works.

9.2 A placement trial may be located within the Site. The size of each placement trial must be limited to one Lot. The Contractor must design the trial to implement all the procedures described in the Quality Plan and demonstrate conformance with this Technical Specification.

9.3 The Contractor must submit a copy of the completed Inspection and Test Plan and all relevant test results and records from the placement trial to the ~~Principal~~Administrator. **Hold Point 4** **Record**

HOLD POINT 4	
Process Held	Placement of Microsurfacing (if a placement trial is specified).
Submission Details	Evidence of a successful placement trial must be provided to the ~~Principal~~ Administrator at least one day prior to the commencement of the remainder of the microsurfacing work.

General

9.4 The Contractor must notify the ~~Principal~~ Administrator of its proposed date for commencement of work on Site. **Witness Point 1**

WITNESS POINT1	
Process	Commencement of Microsurfacing work.
Notification Period	At least 5 working days before the commencement of work on Site.

9.5 The Contractor must ensure that runoff of bituminous materials onto kerbs and shoulder does not occur.

9.6 Joints at intersections must be kept straight.

Cleaning

9.7 Prior to any application of microsurfacing, the pavement must free of loose material, stones, dirt, dust, foreign matter and any areas of oil or fuel spillage.

Typically pavement surface preparation work is arranged by the Principal in advance of any microsurfacing works. This work would typically include:

- repairing any defects such as wide cracks, potholes and structural deficiencies, and
- repairing any edge breaks to re-establish the width of the pavement.

Protection of services and road fixtures

9.8 Any material used in the work must not enter or adhere to gratings, storm water systems (side inlets, gullies), hydrants, valve boxes, manhole covers, bridge or culvert decks or other road fixtures.

Tack coat

9.9 If specified in Clause 1 of Annexure MRTS13.1, ~~T~~the Contractor must apply a tack coat ~~if specified in the Contract documents~~. Where a tack coat is required, it must comprise of bituminous emulsion applied at a rate of 0.1 to 0.3 L/m² of residual binder at 15°C. The bituminous emulsion must comply with MRTS21 *Bituminous Emulsion*. The bituminous emulsion must be allowed to break prior to laying the microsurfacing.

Water fog coat

9.10 The surface may be pre-wet by applying a water fog coat ahead of the spreader box. Water used for pre-wetting the surface must be applied so that the entire surface is damp but with no apparent flowing water ahead of the spreader box.

Weather limitations

9.11 Microsurfacing must not be applied if either the pavement or air temperature is below 10°C and falling but may be applied when both pavement and air temperatures are above 5°C and rising Spreading must not proceed during rain or when rain appears imminent. Surfacing must not proceed where the air temperature exceeds 40°C without consultation with the ~~Principal~~ Administrator and verification that the conditions will not impact on the workability and delivery of the materials.

Rut-filling and correction

9.12 If specified in Clause 1 of Annexure MRTS13.1,~~Where wheel ruts of the surface to be covered are 15 mm or more in depth,~~ a rut-filling or correction course must be applied, prior to placing the microsurfacing. Rut-filling and correction must be carried out using a spreader box capable of laying mix across the varying cross-sectional depth such that it fills the rut and is stable.

> A rut filling or correction course is typically specified where the wheel ruts of the surface to be covered are 15 mm or more in depth.

9.13 The Contractor must nominate:

a) the number of layers of rut-filling or corrector course to be placed

b) the minimum and maximum thickness of microsurfacing to be applied in each layer, and

c) the minimum time between the application of layers.

> The minimum time between the application of layers is typically overnight.

Production of microsurfacing mix

9.14 The Contractor must provide sufficient information for the ~~Principal~~ Administrator to verify that the bituminous emulsion supplied is the same as that nominated in the mix design.

9.15 The microsurfacing must be manufactured to the Job Mix design within the maximum permitted variations specified in Table 9.15.

Table 9.15 – Maximum permitted variations from Job Mix design

Sieve size (mm)	Maximum permitted variation of aggregate particle size distribution in percent passing (by mass)		
	Sizes 4 & 5	**Size 7**	**Size 10**
13.2	Nil	Nil	Nil
9.50	Nil	Nil	± 7
6.70	Nil	± 7	± 7
4.75	± 7	± 7	± 7
2.36	± 5	± 5	± 5
1.18	± 5	± 5	± 5
0.6	± 4	± 4	± 4
0.3	± 4	± 4	± 4
0.15	± 2.5	± 2.5	± 2.5
0.075	± 1.5	± 1.5	± 1.5

Note: The maximum permitted variation in residual binder content must be not more than 0.5% below or 1.0% above that stated in the Job Mix design.

Spreading

9.16 The mixing time must be sufficient to produce a complete and uniform coating of the aggregate and the resulting mixture must be conveyed into the moving spreader box at a rate sufficient to always maintain an ample supply across the full width of the strike-off screed.

9.17 The strike-off must be adjusted to provide an application rate which will completely fill the surface voids and provide a nominal application rate of mix.

9.18 Areas that cannot be reached with the spreader box must be surfaced using hand squeegees to provide complete and uniform coverage. Care should be exercised to leave no unsightly appearance from hand placement.

9.19 ~~A similar finish as applied by the spreader box must be provided on h~~Hand worked areas must be uniform in texture and have a consistent finish.

9.20 The surface must be smooth and true to the specified crown, superelevation and grades.

9.21 Any section of paved material that is loose or broken, mixed with dirt or other impurities or is any way defective must be removed and replaced.

9.22 The longitudinal joints of the wearing course must be placed within 300 mm of either the edge or the centre of a traffic lane. The edges and joints must be lightly screeded with a hand squeegee to achieve a smooth uniform appearance and to remove excess build-up of material. All longitudinal joints must be overlapped. The maximum overlap must be 200 mm and placed to ensure that ponding of water does not occur. The edge of the new microsurfacing must be located within 50 mm of all concrete edgings and sealed shoulders, and within 100 mm of the specified width (or average width of carriageway if not specified) for roads with unsealed shoulders.

9.23 The microsurfacing must be capable of carrying slow moving vehicular traffic (< 40 km/h) within one hour of application without permanent damage occurring, such as rutting or ravelling. If this does not occur, work must cease if directed by the ~~Principal~~ Administrator.

9.24 All surplus microsurfacing must be removed from the site. Any aggregate stockpile sites and/or loading areas occupied for the Works must be restored to a condition similar to that which existed prior to the Contract commencing.

Control of traffic

9.25 The Contractor must take all necessary precautions to protect the work from damage until such time as the new material has developed sufficient strength to carry normal traffic without disturbance.

9.26 Where early use of the new surface is needed to facilitate the movement of traffic, vehicles may be allowed to run on the work after initial rolling has taken place provided that vehicles are controlled to such slow speeds that no displacement of the material occurs. Where necessary, the Contractor must use patrol vehicles to ensure that traffic travels at an acceptable speed.

Rolling

9.27 If rolling is specified in ~~the Contract documents~~ Clause 1 of Annexure MRTS13, the Contractor must ensure that:

a) rolling occurs after the microsurfacing cures sufficiently to prevent delamination and pick-up on the roller tyres, and

b) it is carried out using a self-propelled pneumatic-tyred multi-wheel roller.

Time for Submission of Test Results

9.28 For each lot, the Contractor shall report to the Administrator:

a) Final test results for binder content and combined particle size distribution within 14 days of microsurfacing placements. **Record**

10 Sampling and Testing

General

10.1 The Contractor must undertake the sampling and testing specified in this Clause 10 ~~unless specified otherwise in the Contract documents or the Principal waives any of the requirements for sampling and testing~~.

Sampling

10.2 The methods, number and size of samples must be as follows:

a) Three samples of mixed material from each Lot in accordance with AGPT-T221. Each sample must be a minimum of 1 kg of mixed material.

b) Two 2 litre samples of bituminous emulsion from each bulk delivery in accordance with AS 1160. One sample is for testing as required whilst the second sample is to be retained by the Administrator for reference.

c) Aggregates must be sampled in accordance with AS 1141.3.1.

d) Fillers must be sampled in accordance with ~~AS 2150~~MRTS103 *Fillers for Asphalt*.

10.3 The Contractor must supply all equipment and facilities for sampling, including sample containers.

Compliance Testing

10.4 Compliance testing must be undertaken on a Lot by Lot basis. A Lot must not exceed the lesser of 50 m³ or one ~~day's~~ work shift's production.

10.5 Where multiple paving units are used on a single job site, the testing frequency specified in Table 10.6 applies equally to each paving unit utilised. Where the use of continuous paving units is applied, the Contractor may submit a proposal to the ~~Principal~~ Administrator to decrease the testing frequencies, based on the Contractor's ability to demonstrate consistency of material delivery.

10.6 The Contractor must ensure that testing is undertaken in accordance with Table 10.6 and provide the test results to the ~~Principal~~Administrator. **Record**

Table 10.6 – Test Requirements

Verification requirement	Test Method	Minimum testing or verification frequency	Acceptance Criteria (1)
Component materials			
Emulsion and residual binder	Residue from evaporation: AS/NZS 2341.23 or in accordance with the bituminous emulsion supplier's recommended method	One for each bulk delivery of emulsion	Refer Clause 6.8
	Softening point of the residual binder: AS 2341.18	On the first load then every 5th bulk delivery of emulsion	Refer Clause 6.9
Aggregate properties	All tests specified in Clause 6.	~~Each mix design~~Refer to Clause 4.2	Refer Clause 6
Mineral filler	AS/NZS 2891.3.1, 2891.3.2 or 2891.3.3	Monthly	Refer Clause 6

Verification requirement	Test Method	Minimum testing or verification frequency	Acceptance Criteria (1)
Microsurfacing production			
Particle size distribution	AS/NZS 2891.3.1, 2891.3.2 or 2891.3.3	2 tests per Lot	Refer Clause 9.15
Residual binder content	AS/NZS 2891.3.1, 2891.3.2, 2891.3.3 or AGPT-T234	2 tests per Lot	Refer Clause 9.15
Finished surface			
Shape	ATM 453	5 tests per Lot or as otherwise directed by the ~~Principal~~Administrator	≤ 5 mm deviation from a 3 metre straight edge
Average surface texture depth in the wheel path after trafficking for one month (2)	AGPT -T250 (3)	4 tests per Lot (4)	Sizes 4 & 5: Min 0.4 mm Sizes 7: Min 0.8 mm Sizes 10: Min 1.2 mm

Notes:

(1) Unless specified otherwise in the Contract documents.

(2) The texture requirements do not apply to correction courses.

(3) The Contractor may submit a proposal to the ~~Principal~~ Administrator for an alternative test method to be used; however, the results must be reported as the sand patch texture depth.

(4) The ~~Principal~~ Administrator may waive this requirement after the ~~Principal~~ Administrator and Contractor have undertaken a joint visual inspection of each Lot of completed work.

~~11 Defective Work or Materials~~

~~11.1 For the purposes of this Clause 11, a property that does not conform to the acceptance criteria specified in Table 10.6 constitutes a defect.~~

~~11.2 A "Conforming" Lot meets all of the requirements of this Specification. Where a Lot contains 6 or less defects, that Lot is classified as a "Conditionally Conforming" Lot.~~

11.3 If specified in the Contract documents, the Principal may accept Conditionally Conforming work, but reduced payment, and / or additional testing requirements, will apply to that Conditionally Conforming work. Otherwise, Conditionally Conforming work must be rectified so as to comply with the requirements of this Specification.

11.4 A Lot with more than 6 defects is non-conforming and must be rectified so as to comply with the requirements of this Specification.

11.5 If the test results indicate that the defects arise from aggregate gradings and the Contractor can demonstrate by way of an alternative mix design that the gradings used have no detrimental effect on compliance with the mix properties set out in Table 7.2, the number of defects will be re-calculated based on the alternative mix design.

11.6 The cost of all replacement or correction works including any restoration work to the underlying or adjacent pavement, surface or structure must be borne by the Contractor. Material removed from the works must be replaced by conforming materials.

11.7 Calculation of defects can be based on variation of the aggregate particle size distribution and binder content from the approved mix design as shown in Table 11.7. The aggregate particle size distribution determined from samples taken on the job should be within the appropriate particle size distribution band for that nominal size. The percent passing each sieve must not vary from those specified in the approved mix design by more than the maximum permitted variation shown in Table 9.14. Any value exceeding the limits is counted towards calculation of the total number of defects. The number of defects in a Lot is determined from the average number of defects in the samples representing that Lot.

Table 11.7 – Defects schedule

Measurement	**Variations**	**Number of defects**
% Passing	1 or 2 measurements:	1
13.2 mm		
9.50 mm	3 measurements	2
6.70 mm		
4.75 mm		
2.36 mm		

Measurement	Variations	Number of defects
1.18 mm		
0.6 mm		
0.3 mm		
0.15 mm		
% Passing 0.075 mm	Each increment of 0.5%:	1
Softening Point	Each 2 degrees under the minimum	1
Binder content, % mass	Each 0.25 % in excess of 1.0% over or below 0.5% under the binder content nominated in the approved mix design:	1

* Over the particle size distribution limits for the nominal size specified in Table 6.4 or the maximum permitted variations shown in Table 9.15.

11.8 If the Contractor proposes to rectify non-conforming microsurfacing by means other than removal and replacement with conforming micro surfacing, it must submit a proposal to the Principal with evidence that long term performance of the microsurfacing will not be adversely affected.

11 Supplementary requirements

11.911.1 The requirements of MRTS13 *Microsurfacing* are varied by the supplementary requirements given in Clause 3 of Annexure MRTS13.1.

~~Annexure~~ Appendix A: Summary of Hold Points, Witness Points, Milestones and Records

General requirements for Hold Points, Witness Points, Milestones and Records, are specified in Clause 5.2 of MRTS01 *Introduction to Technical Specifications*.

The Hold Points, Witness Points, Milestones and Records~~following is a summary of the Witness Points / Hold Points that apply to this Specification and the Records~~ that the Contractor must submit to the ~~Principal~~ Administrator to demonstrate compliance with this Technical Specification, are summarised in Table A. There are no Milestones defined.

~~Clause~~	~~Hold point~~	~~Witness point~~	~~Record~~
~~4.1~~	1. ~~Commencement of microsurfacing~~		~~Quality Plan~~
~~5.2~~	2. ~~Commencement or continuation of microsurfacing~~		~~Program of work~~
~~8.5~~	3. ~~Operation using the paving unit~~		~~Calibration Certificates~~
~~9.3~~	4. ~~Placement of microsurfacing (where a placement trial is specified)~~		~~Evidence of successful placement trial~~
~~9.4~~		1. ~~Commencement of microsurfacing work~~	
~~10.6~~			~~Test results~~

Table A – Hold Points, Witness Points, Milestones and Records

Clause	Hold Point	Witness Point	Milestone	Record
4.1	1. Commencement of microsurfacing			Quality Plan (including details of Transport and Main Roads registered mix design and quarry source to be used)
5.2	2. Commencement or continuation of microsurfacing			Program of work

Clause	Hold Point	Witness Point	Milestone	Record
8.5	3. Operation using the paving unit			Calibration Certificates
9.3	4. Placement of microsurfacing (where a placement trial is specified)			Evidence of successful placement trial
9.4		1. Commencement of microsurfacing work		
9.28				Binder content and particle size distribution test results within 14 days of placement
10.6				Test results