



AUS-SPEC

Infrastructure Specifications

1147 Sprayed preservation
surfacing

1147 SPRAYED PRESERVATION SURFACING

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 sprayed preservation surfacing, as documented.

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 INTERPRETATION

Abbreviations

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

- PSD: Particle size distribution.

Definitions

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

- Application rate: Application Rate: the specified or designed coverage of a specified application specified as litres per m².
- Spray applied preservation treatments: Materials designed to be applied to existing sound bituminous surfacings with the intent of prolonging or extending life and condition. These are broken into the following four categories:
 - Rejuvenator: A treatment intended to penetrate and mix into the existing bituminous surface binder to replace part of the lost maltene fraction in oxidised bitumen. Rejuvenators will act to penetrate the existing binder and restore its viscoelastic properties.
 - Enrichment: A sprayed treatment applied to the surface of an existing bituminous surface to replace the eroded mastic (fine aggregate binder) and provide a protective barrier against further oxidation and erosion. These material will not penetrate the existing surface but will serve to incorporate additional binder and additives into the existing bitumen surfacing. Enrichment is also known as Spray Enrichment Surface Treatments (SEST).
 - Polymer Modified Emulsion (PME) treatment. PME are heavier application surface coating applications inclusive of a mineral filler (usually sand or clay) mixed into the bituminous material.

The mineral filler is intended to replace the fine aggregate in more eroded asphalt surfaces. PME is sometimes referred to as a mastic coating or Seal Coating application.

- . Penetrative Asphalt Preservative (PAP): PAP treatments penetrate the asphalt surface through micro-cracks and interconnecting voids to provide a protective barrier inhibiting further oxidation of the bituminous surface binder. PAP is also referred to as a Rhinophalt.
- Material design / formulation: A statement outlining the specific material critical components which forms the basis for QA testing and verification, including any on site dilution or manufacturer recommendations as to use and handling of the product prior to application.
- Aggregates/sand/filler: Some spray applied preservation materials incorporate either the spreading of or inclusion of fillers/sands or aggregates. For the purposes of this worksection these materials are referred to as coarse graded materials and are defined as materials added to (either before spraying to form part of the material applied or after spraying as a dressing) of the application proposed.

1.4 SUBMISSIONS

Execution details

Sprayer calibration: Submit documentation confirming sprayer capability is suitable for the works.

Safety data sheets: Submit data sheets for the treatment agent and materials required.

Product and materials

Treatment design: Submit details of proposed treatment (design) materials, including the following:

- Base bitumen binder used (including class or grade), if required.
- Polymer content and type, if required.
- Material composition of the treatment: Including critical properties such as moisture, solids, and residual binder content.
- Type and supply of added coarse graded material.
- Proposed PSD and volume of added coarse graded component, if required.
- Time surface must remain non trafficable.
- Testing confirming material will provide cohesion of the added aggregates or sand.
- Specified volume of sand or coarse aggregates added or applied to the concentrated preservation material if required.
- Compatibility with existing surface or previous treatments.

Material application: Submit details including the following:

- Requirements for diluting material before application if applicable.
- Binder application rate.
- Coarse graded aggregates/sand application or spreading rate if applicable.

Test reports/certificates of materials: Submit test reports/certificates by a NATA accredited laboratory for the required test methods as follows:

- For each type of material proposed for use in the works, verifying conformance with all properties in **MATERIALS** and the treatment design requirements.
- Quality testing for the treatment agent for the duration of the project, including details of test methods, test accreditation, target test limits or requirements if testing is required.

Operations and maintenance procedures

Maintenance instructions: Submit recommendations periodic maintenance procedures for prolonging the service life of the pavement surface after treatment application and recommendations for subsequent treatments. Include details of treatment frequency, materials and procedures.

Records

Completed works: Provide the records of preservation material application including the following details:

- Site identification.
- Area covered.
- Name and type of material applied.
- Date of works.
- Wearing surface temperature immediately prior to application.

- Application rate of material applied.
- Time of application and time traffic permitted to use treated section.
- Any commentary relevant to the works.

1.5 INSPECTIONS

Notice

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

- Spraying plant and equipment: The calibration certificate and condition of the spraying plant and equipment before commencement.
- Surfacing trial: Completed trial section.
- Non-conforming trial section: If the original trial section is deemed non-conforming, completed new trial section.
- Surface preparation: Completed surface preparation, including repair of surface defects such as crack sealing prior to sealing and the removal of all dirt, fines and oil residues.
- Sprayed surface: Completed surfacing finish before opening for traffic.
- Non-conforming sections: Completed remedial treatment of non-conforming sections.
- Rain affected surfacing: If treatment material is washed off the pavement, the completed reinstated surface.
- Reinstated fixtures and surfaces: Completed clean-up of existing fixtures and adjacent surfaces, and reinstatement of pavement markings before opening for traffic. Installation of temporary pavement markings before opening for traffic and replacement by permanent pavement markings as soon as the surface is completely settled/cured.

2 MATERIAL FORMULATION

2.1 TREATMENT DESIGN

Treatment design requirements

Site assessment: Carry out assessment of the pavement surface, including preparing and testing of localised patches to ascertain the proposed surfacing application rate.

Treatment: Design treatment to suit the condition of the pavement surface including the extent of aging, surfacing type, texture, ravelling and traffic conditions.

Material formulation: Provide details of the composition of the proposed material for pavement preservation:

- Base bitumen binder.
- Polymer content.
- Material composition outlining critical aspects such as moisture and solids content.
- Volume of sand or coarse graded aggregates added or applied to the concentrated. preservation material if required.
- Type and supply and properties of coarse graded material.

Application rate: Determine optimum application rate to suit site conditions.

Formulation design: Submit details of the proposed material formulation to **SUBMISSIONS, Products and materials**.

2.2 TESTING

Quality

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

3 EXECUTION

3.1 PROCEDURES AND PERSONNEL

Community Stakeholder liaison

General: To 1101 Traffic Management worksection. Notify residents and ancillary service providers such as rubbish collectors or public transport of construction activities which will affect access to, or disrupt the use of, their properties.

Notice: Minimum 48 hours, unless the work is of an urgent nature with safety implications **as agreed with the roads authority (e.g. Council)**.

Notification content:

- The nature of the proposed work.
- The reason for it being undertaken.
- The expected duration.
- Changes to traffic arrangements and property access.
- Contact details of the site representative responsible.

3.2 PLANTS, TOOLS AND EQUIPMENTS

Plant and equipment condition

Equipment condition: Maintain all plant and equipment in good working condition at all times and make sure it does not drip fuel, oil, grease or other materials onto the pavement.

Non-conforming plant and equipment: Replace plant or equipment that do not perform the intended function or produce a rejuvenator to the requirements of this worksection. Repair plant or equipment that are dripping.

Mechanical sand spreading equipment: Use equipment capable of spreading at a uniform rate.

Sprayer/ Application equipment

Sprayer features: Use sprayers with a horizontally mounted paddle stirrer or effective method of circulating and stirring material and conform to the following:

- Able to pump fillers that incorporate rejuvenation materials at an even coverage.
- With continuous agitation or mixing capabilities to maintain homogeneous sealer mixture consistency throughout the application process.

Hand applications: Use in areas where it is impractical to use the mechanised equipment.

3.3 AMBIENT CONDITIONS

Weather limitations

Material application: Do not apply if the surface is wet or damp. Apply when both pavement and air temperatures are suitable and when there is no chance of rain before the rejuvenator has cured.

Rain: Do not proceed with spraying if it is raining or if rain is likely to occur before the required rejuvenator curing period, to prevent damage to the rejuvenated surface.

Wind: Do not spray during periods of ~~extreme weather~~ **moderate or higher winds without agreement from the roads authority**.

Return to normal use: Make sure to work within the manufacturer's recommendations for specific material so that climatic factors, application rates, material type and any other influences are equally considered with relation to their respective impact upon material cure time and ability to return site to normal use.

Design anticipated curing time: ≤ 4 hours. Stop work, if the curing time exceeds 4 hours and take appropriate measures to shorten the curing time.

Rain and clean up

Clean up: If rain occurs before the treatment has cured, implement measures to prevent the rejuvenator from contaminating the surrounding area.

Pools of treatment/water from the rain: If required, use suction equipment to remove the treatment and water mixture from sumps or manholes. Dispose of the mixture in an approved manner.

Reinstatement: Reinstatement any material washed off the pavement surfaces by the rain at no additional cost.

3.4 SURFACE PREPARATION

Pavement surface condition

Treatment application: Do not apply if surface is wet or damp, apply only when the surface is completely dry.

Preparation and surface cleaning

Surface cleaning: Make sure the surface is clean and free from foreign material, dirt, debris, lichen, weed, dust, silt, fuel spots, flaking paint, rubber, and other loose material. Clean surface with brooms, mechanically operated rotary brooms and suction brooms, as appropriate.

Extent of surface cleaning: Extend sweeping to minimum 300 mm beyond the edge of each surfacing area.

Defective pavement surface: Repair areas identified as defects within the existing pavement and take appropriate measures prior to the application of any preservation material.

Protection

Existing installations and pavement marking: Protect light fittings, pavement markings, edges of abutting concrete pavements, pits, grates, and other structures within or abutting the area requiring treatment. Cover or mask to prevent treatment material running, being splashed or sprayed onto these installations or surfaces.

Raised pavement markers: Remove and reinstate after completing surfacing or mask the raised pavement markers.

Masking: Mask off end of streets and intersections with tar paper to provide crisp start and finish lines during treatment application.

Protection management system: Implement a protective covering management system to maintain records of the number of coverings used for the work so that during the protective removal process, none are left behind.

Protective covering removal: Remove immediately after completing treatment application and dispose of coverings off site [at a licensed waste management facility](#).

Treatment accidentally deposited on structures/surfaces: Remove immediately. If removal is not possible, replace or rectify the affected part.

Pavement markings: Repaint the marking, then remove masking of raised pavement markers

3.5 APPLICATION OF PRESERVATION TREATMENT

Spraying conditions

Requirement: Spray treatment uniformly to all points of the treatment surfacing area at the required application rate using an approved sprayer as follows:

- Provide a uniform application of binder with adequate adhesion to the underlying surface.
- If required, provide a complete cover of sand particles for early trafficking or to restore skid resistance.

Mixing: Before starting application, circulate material in the sprayer to completely mix the treatment material.

Nozzle condition: After filling or refilling the sprayer with the treatment material and before starting or restarting spraying, check spray nozzles by examining and testing spraying a small quantity of treatment material in an area not on the pavement. Make sure all nozzles are properly functioning and not blocked.

Malfunctioning or defective nozzles: Clean or replace before proceeding with application. Make sure there are sufficient nozzles available for replacement at all times.

Setting out: Before each run is sprayed, mark out the pavement with paint marks or other suitable materials to guide the sprayer when applying the treatment.

Defects in spraying equipment: Stop spraying immediately where there is a defect in the equipment, including blockage or partial blockage of nozzle, until fault is rectified. If the blockage is due to the binder condition, do not use that load with any binder from the same bulk tanker or supply unit.

Areas or spots missed by the spray bar: Treat by hand spraying.

Final surface appearance: Evenly coat over the whole area.

Localised ponding: Carry out hand brooming to even out application and prevent pooling in the grooved areas.

Incorporating and applying coarse graded aggregates or sand

Coarse graded aggregate/sand application: Uniformly spread sand after spraying binder, at the target application rate with mechanical spreading equipment.

Bare or insufficiently covered area: Re-run with a mechanical spreader or spread by hand to provide a uniform and complete coverage.

Loose sand: After spreading, remove loose remaining sand from the pavement within 24 hours of application.

Curing

Curing time: Within 2 hours after application or as determined by the trial section. Determine when the application should be stopped to allow sufficient material curing time depending on weather conditions.

Removal of excess treatment

Removal method: If excess material is applied, remove immediately with squeegees.

3.6 TESTING**Laboratory testing**

Testing procedure: Carry out testing for the properties required by this worksection, in a NATA laboratory accredited for the required test method.

Test sample access: Provide access to the testing samples from the work at any time.

Sampling

Frequency and quantity: Provide sampling as required to verify conformance with the requirements of this worksection and as follows:

- Minimum samples: 1 per each spray tank of treatment material sprayed or 1 per 10,000 litres of treatment material sprayed or per single day's production, whichever is the less.
- Field testing: Provide skid resistance testing of the wearing surface. prior to treatment. Provide British Pendulum Tester or similar method.

3.7 NON-CONFORMANCE**Criteria for assessing non-conformance**

Average application rate: Surfacing areas with application rates below 95% or higher than 105% of the required rate on any spray run constitutes a non-conformance.

Finished surface: If the whole sprayed area is not uniformly treated and the applied material is not completely soaked into the pavement, then the spray run is considered non-conforming.

Rectification or replacement

Non-conforming materials/sections: Replace non-conforming materials or replace or correct non-conforming surfacing sections, including restore underlying or adjacent surface/structure affected by the replacement or correction.

3.8 COMPLETION**Protection of finished surface and final cleaning**

Protection: Prevent vehicles or personnel from trafficking or entering the sprayed area without approval until the pavement is opened to traffic.

Cleaning: At completion of the treatment operations, clean all areas used and remove from the site all traces of spilt treatment and other materials which may be considered as a contaminant.

Inspection

Post completion: Inspect all completed works and review for quality, overspray, aesthetics of the finished works. Record and report post treatment inspections. Complete the inspections within 21 days of application but no sooner than 24 hours following completion.

Opening to traffic

Finished surface: Allow for the final coating of treatment to completely dry before opening to traffic.

4 ANNEXURE A**4.1 ANNEXURE - PROJECT SPECIFIC REQUIREMENTS SCHEDULE**

The use of this schedule in addition to project Drawings on Council or private development works is

optional, at the Superintendent's discretion.

Item	Treatment area/section					Treatment details/Description ^b	Traffic v/l/d ^c	Target application rate (L/m ²)	Other requirements ^d
	Road name	Map ref. ^a	Length (m)	Width (m)	Area (m ²)				

Notes to schedule:

Read the worksection in conjunction with this schedule.

- a. Map references: Nominate directory used.
- b. Include binder and/or sand requirements. Refer to NATSPEC TECHnote GEN 025 for more information and guidance on the most appropriate treatment based on the road condition.
- c. v/l/d: Use design traffic calculation methods included in Austroads AP-T236 (2013) or Austroads AP-T310 (2016).
- d. Other requirements: May include job specific requirements such as surface pretreatment requirements.

4.2 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 Roads Authority (e.g. Council) to authorise release.

Clause and description	Type	Submission/Inspection details	Submission/Notice times	Process held
SUBMISSIONS, Products and materials Treatment design	H – Superintendent and Roads Authority	Details of treatment design materials.	2weeks before commencement	Ordering and delivery of materials
SUBMISSIONS, Products and materials Test reports/certificates	H	Test reports/certificates for each material type as evidence of conformance.	2 weeks before commencement	Ordering and delivery of materials
INSPECTIONS, Notice Spraying plant and equipment	W	The condition of the spraying plant and equipment before commencement.	1 day before commencement	Spraying
SUBMISSIONS, Execution details Sprayer calibration	H	Evidence of sprayer capability.	1 day before spraying/surfacing trial	Spraying/surfacing trial
SUBMISSIONS, Records Plants and equipment	H	Evidence of plant and equipment registration and insurance.	1 day before using plant	Spraying
INSPECTIONS, Notice Surfacing trial	H – Superintendent and Roads Authority	Completed trial section.	1 day before normal surfacing	Acceptance of trial section
INSPECTIONS,	H –	Completed new trial section.	1 day before the	Spraying

Clause and description	Type	Submission/Inspection details	Submission/Notice times	Process held
Notice Non-conforming trail section	Superintendent and Roads Authority		inspection	
INSPECTIONS, Notice Surface preparation	W – Superintendent and Roads Authority	Completed surface preparation, including repair of surface defects.	Before spraying surfacing, so that inspection can be conducted before spraying	Spraying
INSPECTIONS, Notice Sprayed surface	H – Superintendent and Roads Authority	Completed surfacing finish before opening for traffic.	After spraying	Linemarking application and opening to traffic
INSPECTIONS, Notice Non-conforming sections	H – Superintendent and Roads Authority	Completed remedial treatment of non-conforming sections.	After remedial treatment	Linemarking application and opening to traffic
INSPECTIONS, Notice Rain affected surfacing	W	Completed reinstatement of surface.	After remedial treatment	Linemarking application and opening to traffic
INSPECTIONS, Notice Reinstated fixtures and surfaces	W – Superintendent and Roads Authority	Completed clean-up and reinstatement of existing fixtures, surfaces and pavement markings.	After reinstatement and clean-up	Opening to traffic

Note: H = Hold Point, W = Witness Point

4.3 ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES

Activity	Material	Property	Maximum lot size	Minimum test frequency	Test method/ Conformance assessment
Treatment	Treatment	Properties of rejuvenator	1 contract	Manufacturer's recommendations	Manufacturer's recommendations
		Binder extraction	1 contract	1 per lot	Austrroads AGPT/T191 (2015)
		Particle size distribution	1 contract	1 per 1000 m ³	AS 1289.3.6.1 (2009)
		Compatibility of emulsion or rejuvenating agent with water	1 contract	1 per 10,000 litres of water	RMS T569 (2012)

4.4 ANNEXURE - PAY ITEMS

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

Measurement by surfacing area or length table

Pay Items	Unit of measurement	Schedule rate scope
1147.1 Surfacing treatment	Area - m ²	No deductions for openings not exceeding 1 m ² each. All costs associated with surface preparation and supply and spray of surfacing treatment.

Pay Items	Unit of measurement	Schedule rate scope
1147.2 Existing raised pavement markers	Measured by length in kilometres	All costs associated with the removal, reinstatement or disposal of existing raised pavement markers.
Traffic management	Lump sum	To 1101 Traffic management.

Measurement by quantity of material supplied table

Pay items	Unit of measurement	Schedule rate scope
1147.3 Surfacing treatment	Litres	All costs associated with the surface preparation and supply and spray of surfacing treatment.
1147.4 Sweeping	m ²	All costs associated with sweeping before and after spraying.

Acceptance of non-conformities

~~Items considered acceptable subject to deductions to the schedule of rates:~~

4.5 ANNEXURE - REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1289		Methods of testing soils for engineering purposes
AS 1289.3.6.1	2009	Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving
Austrroads AGPT/T191	2015	Extractions of bituminous binder from asphalt
Austrroads AP-C87	2015	Austrroads glossary of terms
RMS T569	2012	Compatibility of bitumen emulsion with local water
EN 15804	2012	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
ISO 14025	2006	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 21930	2017	Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services
Austrroads AP-T310 surfacings	2016	Selection and design of initial treatments for sprayed seal
Austrroads AP-T236 design method	2013	Update of double/double design for Austrroads sprayed seal
NATSPEC GEN 025	2017	Sprayed preservation surfacing treatments

5 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

6 AMENDMENT HISTORY

0	15/01/2024	First Published
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