

SECTION 408 - SPRAYED BITUMINOUS SURFACINGS

~~##This section cross references Sections 166, 175, 310, 801, 831 and 832.~~

~~If any of the above sections are relevant, they should be included in the specification.~~

~~If any of the above sections are not included in the specification, all references to those sections should be struck out, ensuring that the remaining text is still coherent:~~

408.01 GENERAL

This section covers the requirements for materials, design and application of sprayed bituminous surfacings including primes and sprayed seals of various types.

408.02 STANDARDS

Table 408.021 Referenced Documents

AAPA Health and Safety Guide	
AAPA HSE Guide No.8	Environmental management when spraying bituminous materials
Australian Standards	
AS 1160	Bituminous emulsions for the construction and maintenance of pavements
AS 2008	Bitumen for pavements
AS/NZS 2106.1	Methods for the determination of the flash point of flammable liquids (closed cup) Abel closed cup method
AS 2106.2	Methods for the determination of the flash point of flammable liquids (closed cup) Determination of flash point - Pensky-Martens closed cup method
AS 2157	Cutback bitumen
Austroads	
AGPT4K	Guide to Pavement Technology: Part 4K: Selection and Design of Sprayed Seals
AGPT-T530	Calibration of Bitumen Sprayers: General Introduction and List of Methods
AGPT-T531	Calibration of Bitumen Sprayers: Volumetric Calibration of Bitumen Pumping Systems
AGPT-T532	Calibration of Bitumen Sprayers: Transverse Distribution by Fixed Pit Facility
AGPT-T533	Calibration of Bitumen Sprayers: Transverse Distribution by Field Mat
AGPT-T534	Calibration of Bitumen Sprayers: Transverse Distribution by Portable Trough
AGPT-T535	Road Speed and Distance Calibration
AGPT-T536	Viscosity of Calibration Fluid
ATS-3110	Austroads Technical Specification: Supply of Polymer Modified Binders
ASTM International Standards	
ASTM D86	Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure
ASTM D93	Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester
ASTM D276	Standard Test Methods for Identification of Fibers in Textiles
ASTM D445	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
ASTM D1298	Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
ASTM D3828	Standard Test Methods for Flash Point by Small Scale Closed Cup Tester
ASTM D4052	Standard Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter
ASTM D6140	Standard Test Method to Determine Asphalt Retention of Paving Fabrics used in Asphalt Paving for Full-Width Applications
VicRoads Test Methods	
RC 317.01	Test Method for Surface Texture by Sand Patch
RC 317.03	Test Method for Stripping of Aggregate from Sprayed Seals

Section 175 details the revision dates of the relevant references in this section.

408.03 DEFINITIONS

Adhesion Agent

A wetting agent designed to promote adhesion of binder to aggregate.

Aggregate Retention

Retention of aggregate particles by the binder under traffic. The degree of aggregate stripping is measured to assess aggregate retention.

Effective Spray Width

The width that the full design binder application rate is achieved. This width can vary depending on the type of end nozzles used. Where EAN18 end nozzles are used the effective width is considered to be 100 mm outside of the end nozzles.

Final Seal (FS)

The application of a sprayed seal treatment to a surface previously treated with an Initial Treatment.

Forward Aggregate Discharge Plant

Any item of plant or device approved by the Superintendent Council that loads aggregate into a vehicle/truck or hopper for the use in the process of forward aggregate spreading.

Forward Aggregate Spreading Plant

Any item of plant or device approved by the Superintendent Council that uniformly spreads aggregate on to the road surface at a predetermined rate and width while the vehicle is travelling in a forward direction and the operator/driver of the vehicle is facing in the direction of travel.

Polymer Modified Binder (PMB)

A bituminous binder with modified properties achieved by the addition of a polymer or crumb rubber.

Prime

An Initial Treatment comprising of the application of a bituminous primer to a prepared granular pavement base or concrete surface without cover aggregate.

Initial Seal (IS)

An Initial Treatment involving the application of a bituminous binder and covered with aggregate to a prepared basecourse which has not been primed to provide a temporary bituminous surfacing.

Initial Treatment

The application of a bituminous treatment to a prepared granular pavement base either as a prime or Initial Seal.

Reseal (R)

The application of a sprayed seal treatment over an existing bituminous surfacing.

Residual Binder

The volume of bituminous binder at 15°C including the volume of any polymer, crumb rubber but does not include the volume of any cutter, water, emulsifier or adhesion agent.

Reverse Aggregate Spreading Plant

Any item of plant or device that uniformly spreads aggregate at a predetermined rate and width while the vehicle is operating in a reverse direction (e.g. tip trucks with box spreaders attached).

Sprayed Seal

The sprayed application of bituminous binder to a previously primed or sealed surface followed by an application of aggregate to form an all-weather skid resistant road surfacing.

Types of sprayed seals include:

- Conventional (C), where the bituminous binder is generally Class 170 bitumen.
- High Stress Seal (HSS), where the bituminous binder is a lightly modified PMB (S10E, S35E) or has 9% (10 parts) of crumbed rubber added to aid aggregate retention on heavily trafficked roads. HSS seals may be applied as a single/single application (HSS1) or as a double/double application (HSS2).
- Extreme Stress Seal (XSS), is a double/double treatment where the bituminous binder is a heavily modified binder (S20E, S45R, S15RF), to accommodate extreme stresses imposed by heavy traffic volumes and high proportions of heavy vehicles or difficult service conditions.
- Strain Alleviating Membrane (SAM), where the bituminous binder is a heavily modified PMB (S20E, S45R, S15RF), to treat cracked pavements.
- Strain Alleviating Membrane Interlayer (SAMI), where the bituminous binder is a very heavily modified PMB (S25E, S18RF) to inhibit cracks reflecting through to an overlying surface.
- A Geotextile Reinforced Seal (GRS), where the bituminous binder is reinforced by the inclusion of a geotextile fabric to treat extensively cracked pavements. It is a form of SAM or SAMI where enhanced crack suppression is required.
- A Fibreglass Reinforced Seal (FRS) is a seal where the bituminous binder is reinforced by the inclusion of chopped fibreglass strands to treat cracked pavements. It is a form of SAM or SAMI where enhanced crack suppression is required but where a GRS cannot be placed.

Surface Enrichment (SE)

A light application of cutback bitumen or bitumen emulsion to an existing highly textured bituminous surfacing in very low or non-trafficked areas to extend the life of an existing sprayed seal or asphalt surface.

Surface Pre-Treatments

Surface pre-treatments include any sprayed bitumen, aggregate, combination of sprayed bitumen and aggregate, High Pressure Water Retexturing (HPWR), or other treatment approved by the Superintendent Council-that is applied prior to the specified sprayed seal.

Surface Texture

The mean height of aggregate particles above the level of the binder as determined by VicRoads Test Method RC 317.01.

408.04 COMMENCEMENT OF WORK

- (a) Periodic Resurfacing and Maintenance Works

~~Within 2 weeks of the Date of Award of Contract the Contractor shall submit to the Superintendent for review the sealing program for the whole of the works.~~

During the period of the Contract works, the Contractor shall submit by the preceding Thursday to Council a detailed program of planned sealing jobs for the following week for review by the Superintendent, including planned dates for each sealing job.

- (b) Construction Projects

The Contractor shall include details of all sprayed bituminous surfacing works on the Construction Program.

During the period of the Contract works, the Contractor shall submit by the preceding Thursday to Council a detailed program of planned sprayed bituminous surfacing works for the following week for review by the Superintendent, including the planned sprayed bituminous surfacing works for each day.

HP Prior to the works being carried out, the Contractor shall provide written confirmation of the works that will be undertaken the following day and obtain agreement from the Superintendent Council to any variation in the design rates of application to those provided under clause 408.13(a).

HP Work shall not commence until the Contractor and the Superintendent Council have agreed that the road or pavement surface is fit and ready for surfacing no more than 24 hours prior to the works occurring. For Periodic Resurfacing and Maintenance Works this includes patching and other preparatory works, and for Initial Seals on Construction Projects the requirements of Standard Section 310 shall be satisfied.

408.05 LIMITS OF WORK

~~Where the Job Items are detailed in Table 408.191, the~~ The limits of work at the start and finish chainages plus the limit in any side road that have been marked on the pavement surface.

The Works shall include all existing tapers, bell mouths at intersecting roads, pavement widenings (turn lanes), traffic lanes and sealed shoulders, unless otherwise specified.

~~The Superintendent Council may increase or decrease the limits of work for Job Items listed in Schedule 1. The Contractor will be notified in writing prior to works commencing of such adjustments to the limits of work for any job. The Contract Sum shall be adjusted on a pro-rata basis using the Item price tendered in Schedule 1 and the difference in area of the revised works.~~

~~The areas for items listed in Table 408.191 are accurate to $\pm 5\%$.~~

408.06 INCLUSION AND DELETION OF JOB ITEMS

~~The Superintendent may cancel any work, subject to notice of cancellation being given at least one week prior to the proposed commencement date.~~

~~The Contractor will be notified in writing of such deletion and the Contract Sum adjusted by the price tendered in Schedule 1 for the job item/s deleted.~~

~~No additional payment will be made as a result of the deletion of any job item. However, where the deletion of job items results in a Contract Sum reduction of more than 20% of the original Contract Sum, the deletion of job items in excess of this amount will be treated as a variation in accordance with the Contract.~~

~~In the event of aggregate having been delivered to a job stacksite and the job is deleted in accordance with this clause, the cost of the removal of the aggregate and any loss of aggregate shall be treated as a variation in accordance with the Contract.~~

~~The Superintendent may request the Contractor to undertake additional sealing works at sites not listed in Schedule 1. These works will be treated as a variation in accordance with the Contract.~~

408.07 CALIBRATION OF BITUMEN SPRAYERS

All sprayers used for application of bituminous materials shall have a current Certificate of Calibration showing compliance with Austroads test methods AGPT-T530 through to AGPT-T536. The Certificate of Calibration shall be renewed every 12 months. If any sprayer has its spray equipment overhauled or replaced, it shall be calibrated and issued with a new Certificate of Calibration prior to use.

408.08 BITUMINOUS MATERIALS**(a) Bitumen**

Unless otherwise specified, bitumen shall be Class 170 complying with the requirements of AS 2008. The value for the long-term effect of heat and air shall be not be less than nine days.

Bitumen incorporating up to 5% (five parts) of crumb rubber shall be considered to be an unmodified bituminous binder. Bitumen incorporating manufactured polymers that provide a similar level of modification may also be considered to be unmodified binders, subject to the approval of ~~the~~ Superintendent Council.

(b) Bitumen Emulsion

Bitumen emulsion shall comply with the requirements of AS 1160.

The use of any non-standard proprietary classes of bitumen emulsion shall be subject to the Contractor providing evidence that the product has demonstrated satisfactory field performance for a period of at least three years. Restricted use of untried products on a trial basis shall be subject to the approval of ~~the~~ Superintendent Council.

(c) Cutback Bitumen

Cutback bitumen shall comply with the requirements of AS 2157. An equivalent product may be used subject to the Contractor providing evidence satisfactory to the Superintendent Council that the proprietary product has demonstrated acceptable field performance for a period of at least three years. Restricted use of untried products on a trial basis shall be subject to the approval of the Superintendent Council.

(d) Polymer Modified Binder (PMB)

The class of PMB shall comply with the requirements of Austroads Technical Specification ATS-3110.

Alternative or 'ungraded' PMBs which do not comply with the specified test requirements of ATS-3110 shall not be used without approval by the Superintendent Council and will be subject to the Contractor providing evidence that the product has delivered satisfactory field performance for a period of at least three years. Restricted use of untried products at nominated trial sites shall be subject to the approval of the Superintendent Council.

(e) Primer

The primer shall be cutback bitumen complying with the requirements of clause 408.08(c) and shall be water resistant, of uniform appearance and capable of providing a strong bond between the bituminous surfacing and the pavement. Proprietary classes of bitumen emulsion may be accepted by the Superintendent Council as an alternative to cut back bitumen if evidence is provided to show that the emulsion product meets the same functional requirements.

408.09 OTHER MATERIALS

(a) Adhesion Agent

Adhesion agent may be added to the aggregate precoat or binder to promote adhesion to the cover aggregate and/or pavement surface. The type of adhesion agent and the percentage to be used shall be subject to the Contractor providing evidence that the proprietary product has satisfactory field performance. When adhesion agent is added to the binder, the total volume of adhesion agent and diluent shall not exceed 1% by mass of the binder.

(b) Aggregate Precoating Material

Aggregate precoating material shall be a distillate, distillate-based product, cutback bitumen, emulsion or proprietary product subject to the Contractor providing evidence that the proprietary product has demonstrated satisfactory field performance for a period of at least three years. Restricted use of untried products on a trial basis shall be subject to the approval of the Superintendent Council.

(c) Crumb Rubber

Crumb rubber must be sourced from waste tyres generated in Australia and processed by a Tyre Stewardship Australia accredited supplier and shall be free from cord, wire, fluff and other deleterious material.

(d) Cutter

All cutters shall comply with the properties in the Table 408.091.

Table 408.091 Properties of Cutter

Property	Cutter ⁽¹⁾		Method of test
	Requirement		
	Min.	Max.	
Appearance	Clean, bright and visually free from solid matter and undissolved water at ambient temperature		–
Flash point (°C)	61.5	–	AS/NZS 2106.1 or AS 2106.2 or ASTM D93 or ASTM D3828 ⁽²⁾
Distillation range			ASTM D86
Initial boiling point (IBP) (°C)	140	–	
Final boiling point (FBP) (°C)	–	300	
Viscosity at 40°C (mm ² /s)	0.7	2.5	ASTM D445
Density at 15°C (kg/m ³)	Report		ASTM D1298 or ASTM D4052

Notes to Table 408.091

1 Cutter shall be completely miscible with bitumen and no precipitation shall occur.

2 Whichever of the listed test methods that is applicable for the flash point range of the material.

Other cutters which do not comply with the requirements of Table 408.091 but have a flash point of 61.5°C or higher, or other methods of temporarily lowering the viscosity of the binder may be used subject to the Contractor providing evidence that such methods or products have demonstrated satisfactory field performance for a period of at least three years.

Restricted use of untried products or processes on a trial basis shall be subject to the approval of the Superintendent Council.

(e) Geotextile Fabric

Unless otherwise specified or approved by the Superintendent Council, all geotextile fabric used for geotextile reinforced seals shall be a non-woven needle punched fabric. The mass of the fabric shall be a minimum of 135 g/m² for seals of nominal maximum size of 14 mm and under, and 175 g/m² for seals of nominal maximum size of larger than 14 mm. The geotextile fabric shall have a melting point when determined in accordance with ASTM D276 at least 10°C above the maximum binder spraying temperature. The binder retention allowance shall be determined in accordance with ASTM D6140 with a C170 bitumen.

408.10 BINDERS FOR TREATMENT TYPES

(a) Initial Seal Binder

The binder to be used in Initial Seals shall be a suitable cutback bitumen, bitumen emulsion or a 9% (10 parts) crumb rubber modified binder. Other modified binders may be used subject to approval of the Superintendent Council.

The Initial Seal shall be waterproof and capable of adhering to the pavement surface while retaining sufficient binder on the surface to hold the aggregate in place.

(b) Final Seal and Reseal Binders

Unless otherwise specified in Table 408.191, one of the following binder classes and seal sizes outlined in Table 408.101 shall be used.

Table 408.101 Binder Class for Treatment Types

Treatment Type	Binder Class	Seal Type	Typical Aggregate Sizes
Conventional	C170, C240, C320	Single/single Double/double	7,10,14 10/5, 10/7, 14/7, 20/7
HSS	S10E, S35E 10 parts rubber	Single/single Double/double ⁽¹⁾	7, 10, 14 10/5, 10/7, 14/7, 20/7
XSS	S20E, S15RF S45R	Double/double ⁽¹⁾	14/7, 20/7
SAM	S20E, S15RF, S45R	Single/single Double/double ⁽¹⁾	10, 14 10/5, 10/7, 14/7, 20/7
SAMI	S25E, S18RF	Single/single Double/double ⁽¹⁾	10, 14 10/5, 10/7, 14/7
GRS SAM	C170, C240, C320	Double/double	14/7, 20/7
GRS SAMI	C170, C240, C320	Single/single Double/double	10, 14 10/5, 10/7, 14/7

Notes to Table 408.101

(1) These treatments may incorporate a geotextile fabric layer where specified.

408.11 AGGREGATE

(a) Aggregate Specification

Aggregate shall comply with the following Standard Specification Sections:

- 801 - Source Rock for the Production of Crushed Rock and Aggregates
- 831 - Aggregate for Sprayed Bituminous Surfacing
- 832 - Sands for Sprayed Bituminous Surfacing.

(b) Aggregate Precoating

The Contractor shall provide either plant precoated aggregate or field precoated aggregate.

Aggregate precoating shall be undertaken using a purpose-built item of plant to apply the precoating material in a controlled manner that produces a uniform coating

408.12 USE OF STACKSITES

(a) General

~~Department of Transport stacksites available for use by the Contractor for stockpiling of aggregate prior to placement are shown in Table 408.192.~~

~~The available stacksites are not guaranteed as suitable for the Contractor's operations or that they are of sufficient capacity to accommodate any or all of the quantities needed by the Contractor.~~

~~Any stacksites used by the Contractor during the Contract shall be cleaned and returned to their original condition within four weeks of completion of the use of that stacksite for works under the Contract. Where the Contractor does not clean any stacksite used as specified, the Superintendent may arrange for it to be done by others at the Contractor's expense.~~

No stacksites are to be constructed on the road reserve.

The use of stacksites on ~~other~~ road reserves (such as municipal stacksites), or on other public or private land require the approval of the relevant authority or owner ~~prior to use for items under the Contract.~~

Aggregate stored at stacksites shall be managed to avoid contamination from other materials on the stacksite or from other sources such as vegetation, debris etc.

(b) Placement of Stacks

The following requirements shall apply to the placement of aggregate and materials:

- (i) stacks shall be placed so they do not unduly reduce sight distance at locations such as intersections and curves
- (ii) stacks shall not be placed under or immediately adjacent to power lines and shall comply with all "No-Go Zones" and the relevant requirements for electrical spotters
- (iii) stacks shall not be placed at locations where any sealing operations, including aggregate delivery will interfere with trees or structures
- (iv) stacks shall be placed clear of the road formation, drains, gateways and side tracks
- (v) for aggregate placed on roadside stacksites, stacks shall be placed within the limits of the existing cleared area at the stacksite.

~~(c) Safe Work Method Statement~~

~~Prior to using any stacksite, the Contractor or relevant parties shall submit a Safe Work Method Statement addressing the requirements of the SWMS Checklist in Appendix ##:~~

408.13 APPLICATION OF BITUMINOUS MATERIAL, AGGREGATE AND GEOTEXTILES**(a) Design Rates of Application**

The Contractor shall determine the design rates of application for primer, binder, surface pre-treatments, remedial works and aggregate in accordance with the procedures set out in the Guide to Pavement Technology (Austroads): Part 4K. The design calculation shall clearly show how design rates have been determined including all traffic and EHV allocations to each lane, voids factors, allowances, assumptions and any supporting data.

All rates of application of bituminous material shall be expressed in L/m². In the case of binder, rates of application shall refer to residual binder at 15°C.

All rates of application of aggregates shall be expressed in m²/m³ and rates of application of precoat shall be expressed in L/m³.

Traffic data and default rates of application for bituminous material are specified in Table 408.191.

HP ~~At least one week prior to the commencement of work, the~~ **The Contractor shall submit the initial design rates of application for bituminous material, aggregate, and rates for pre-treatment for review by the Superintendent Council.**

Final design rates for primer, binder, surface pretreatments, remedial works and aggregate may be varied at any time prior to the application of the treatment where notification of any such adjustments are provided to the ~~Superintendent Council~~ in writing.

(b) Surface Pre-treatment

Surface pre-treatments to correct variable surface texture shall be allowed for by the Contractor and carried out as part of the works to meet the requirements of Surface Texture and Aggregate Retention specified in Tables 408.152 and 408.153. Where the ~~Superintendent Council~~ has included a requirement for pre-treatment in Table 408.191 this does not limit the Contractor's responsibility for pre-treatments on all jobs. ~~The cost of surface pre-treatments shall be included in the lump sum works.~~

The acceptance criteria for Surface Texture and Aggregate Retention shall apply as specified in Tables 408.152 and 408.153 unless these requirements are waived in Table 408.191.

(c) Geotextile Fabric Sprayed Seals

Geotextile fabric shall be fixed to the pavement surface free of wrinkles and/or folds. Transverse joints shall be butt jointed.

Longitudinal joints shall be overlapped by approximately 150 mm and be located along lane lines. The Contractor shall make an allowance for additional binder to be applied along the joint so that both geotextile layers are adequately saturated with bitumen. This allowance shall be included in the Contractor's seal design.

Bond coats shall be applied so that the effective width of the bond coat extends approximately 100 mm beyond the width of the fabric being placed.

(d) Minimum Temperature

Unless otherwise approved by the ~~Superintendent Council~~, the Contractor shall not apply any sprayed bituminous treatments unless the air and pavement temperature are above those listed in Table 408.131 and rising. The minimum temperature shall not apply for Strain Alleviating Membrane Interlayer (SAMI) treatments which will not be trafficked, prior to the SAMI being overlaid.

In addition to Table 408.131 priming and initial sealing shall only be undertaken when the prevailing weather conditions, when assessed in accordance with *AAPA HSE Guide No.8 – Environmental management when spraying bituminous materials*, have a risk rating of 'low' or less and appropriate work practices to minimise risks are in place.

Table 408.131 Minimum Temperatures for Spraying Bituminous Materials

Treatment Type	Minimum air and pavement Temperature (°C)
Initial Treatments	
Primes	10
Initial seals (single/single)	15
Initial seals (double/double)	10
Reseal Treatments	
C170 and crumb rubber modified PMBs	15
Other PMBs	20
Geotextile Reinforced seals	20

(e) Aggregate Spreading

The Contractor shall include in their quality plan a method to measure and assess the aggregate spread rates applied.

(f) Forward Aggregate Spreading

~~Forward aggregate spreading is encouraged but not mandatory for sealing works delivered prior to 1 July 2022.~~

Where forward moving aggregate spreading plant is used, no aggregate spreading or discharge from that item of plant will be permitted in a reverse direction. This includes plant items which discharge into self-propelled aggregate spreaders.

Forward aggregate spreading and discharge plant shall require that the operator of that plant is facing in the direction of travel. Vehicles or devices may include synchronised bitumen spraying and aggregate spreading or independent aggregate spreading only.

The combination of both forward and reverse aggregate spreading techniques will be accepted on the same section of road and sprayer run during the transition period.

HP Where the Contractor proposes to use forward aggregate spreading plant, written approval is required from the Superintendent Council prior to use., unless written approval has been previously provided by the Department of Transport.

~~**(g) Additional Payment for Forward Aggregate Spreading**~~

~~Contractors who use forward aggregate spreading techniques prior to 1 July 2022 shall be entitled to additional payments for completed seal treatments above the Contract Sum as follows:~~

- ~~—— (i) a value recognition for the use of forward aggregate spreading techniques of an additional payment of 50 cents per square metre sealed; and~~
- ~~—— (ii) an early adopter's incentive for the use of forward aggregate spreading technique of a further additional payment of 20 cents per square metre sealed for all sealing works delivered prior to 1 July 2020.~~

~~For all sealing works delivered after 1 July 2022, the forward aggregate spreading requirement shall be mandatory for all sprayed sealing works and all associated costs shall be deemed to have been incorporated into the Contract Sum.~~

~~If a combination of forward and reverse spreading or discharge plant or devices are used on the same works or section of road, a pro-rata rate will be used to determine any additional payment. (e.g. if one forward spreading vehicle and two reverse spreading vehicles are being used, the additional payment shall be paid on one third of the total square metres sealed for that part of the Contract provided that the forward aggregate spreading plant has undertaken a commensurate amount of aggregate spreading for the works).~~

~~For sprayed seals consisting of multiple application of aggregates, payments as described in this clause shall only be applicable to the area of the completed sprayed seal treatment.~~

~~For multiple year contracts the additional payments shall only be applicable to the years as specified in this clause.~~

(h) Rolling of Aggregate

Rolling of aggregate shall:

- (i) be undertaken over the full width of the pavement being sealed including any untrafficked areas
- (ii) be undertaken by static rubber tyred rollers or rubber coated steel drum rollers unless otherwise specified or approved by ~~the Superintendent Council.~~

~~Rolling of aggregate using rollers where the operator faces in the direction of travel of the roller at all times is encouraged but not mandatory for sealing works delivered prior to 1 July 2030.~~

~~From 1 July 2030 the only rollers that shall be used for sealing works will, at all times, have the operator facing in the direction of travel of the roller.~~

~~There shall be no additional payment for forward facing rollers prior to 1 July 2030.~~

(i) Sweeping of road surface prior to application of a seal treatment

All surfaces shall be inspected prior to the application of a sprayed seal treatment to ensure that a clean surface is available for sealing works that is free from dirt, loose aggregate and other detritus.

HP For multiple application treatments, intermediate sprayed seal layers shall be thoroughly swept to ensure that loose aggregate particles are removed prior to the application of the subsequent sprayed seal layers. This includes areas where an overlap of aggregate has occurred during the spreading operation.

408.14 REMOVAL OF LOOSE AGGREGATE

After the completion of a sprayed seal treatment, the Contractor shall remove and dispose of all loose aggregate within the maximum time limits as specified in Table 408.141. This includes loose aggregate on all trafficked areas, and areas where loose aggregate has been swept, or moved by traffic onto sealed shoulders or non-trafficked areas, or into other areas such as concrete channels, traffic islands, medians, open drains, drainage pits, footpaths, nature strips, or verges.

Table 408.141 Maximum Time Limit for Removal of Loose Aggregate

Traffic Volume (AADT) *	Maximum Time Limit
>5000 and all Freeways	Within 8 hours of sealing
>2000 to 5000	Within 24 hours of sealing
>500 to 2000	Within 48 hours of sealing
<500	Within 5 days of sealing

* Annual Average Daily Traffic - refer to Table 408.191 for AADT for each Job Item

Until loose aggregate is removed from the sealed surface, traffic speed shall be controlled by signing and installation of road works speed limits in accordance with Standard Specification Section 166.

Loose aggregate shall not be removed until the aggregate has properly bedded down into the binder by either trafficking or rolling. Any damage to the sprayed seal resulting from removal of loose aggregate shall be repaired by the Contractor.

Rotary brooms and/or suction sweepers are permitted to remove loose aggregate from the trafficked areas, unless otherwise specified.

~~Loose aggregate may be temporarily stored at the stack sites nominated in Table 408.192.~~

For seals of nominal size 10 mm and over, including multiple application seals:

After the removal of loose aggregate and at any time during the Defects Liability Period, no more than 40 loose stones in any square metre of pavement shall remain. This includes stones that have originated from the area sealed under the Contract and which have accumulated on adjacent sealed areas such as intersections, additional traffic lanes (in either direction), shoulders and flanks.

On job items where 40 loose stones or more are measured, warning signs shall be erected within eight hours, and the site shall be re-swept, or the loose stones removed within 48 hours of measurement.

For seals of nominal size 7 mm and under:

After the removal of loose aggregate and at any time during the Defects Liability Period, no more than 60 loose stones in any square metre of pavement shall remain. This includes stones that have originated from the area sealed under the Contract and which have accumulated on adjacent sealed areas such as intersections, additional traffic lanes (in either direction), shoulders, and flanks.

On job items where 60 loose stones or more are measured, warning signs shall be erected within eight hours, and the site shall be re-swept, or the loose stones removed within 48 hours of measurement.

408.15 ACCEPTANCE OF WORK

(a) Rates of Application for Binder

The Contractor shall produce evidence to show that the actual rate of application for a Job Item, or segments of a Job Item with different design rates of application, complies with the final submitted design rates of application. ~~Variation between the actual rates and the design rates will be assessed in accordance with Table 408.151.~~

~~If a payment deduction or rectification is required in respect of unsatisfactory surface texture or aggregate loss as specified in parts (b) and (c) of this clause, deductions under Table 408.151 will not be applied.~~

Table 408.151 Variation in Rates of Application of Bituminous Material

Variation from the Design Rates of Application for Bituminous Material (L/m ²) *	Assessment
< 0.1 L/m ² below the design rate of application	Accept
≥ 0.1 L/m ² to 0.2 L/m ² below the design rate of application	Deduct \$0.75/m ² for the affected area provided that minimum texture and aggregate retention requirements are met
> 0.2 L/m ² below the design rate of application	Deduct \$1.50/m ² for the affected area provided that minimum texture and aggregate retention requirements are met

* ~~The variation from the Design Rate of Application for SAM seals or SAMIs may be increased by 0.05 L/m².~~

~~Acceptance or otherwise of the criteria specified in Table 408.151 shall not relieve the Contractor from its obligations under the Contract.~~

(b) Surface Texture

Acceptance of work for surface texture and surface enrichment shall be based on visual assessment. However, in marginal cases the Superintendent Council may request that nominated areas be tested in accordance with VicRoads Test Method RC 317.01 and assessed in accordance with Table 408.152. The test lot size shall not be less than 100 m of single traffic lane or more than 600 m of single traffic lane. For any testing undertaken on areas other than within traffic lanes, the minimum lot size shall be not less than 400 m² or more than 2500 m².

Table 408.152 Surface Texture Requirements

SINGLE/SINGLE TREATMENTS						
Treatment	Mean Texture Depth (mm)				Action Required	
	Size 5	Size 7	Size 10	Size 14		
Seals (All Types) ⁽¹⁾	1.0 to 1.6	1.3 to 1.8	1.5 to 2.5	2.0 to 4.0	Accept	
	0.8 to 1.0 or 1.6 to 1.8	1.2 to 1.3 or 1.8 to 2.0	1.3 to 1.5 or 2.5 to 3.0	1.7 to 2.0 or 4.0 to 4.5	Work to be rectified. The Superintendent may require rectification of the works or elect to reduce payment for the lot by \$1.00/m ²	
	< 0.8 or > 1.8	< 1.2 or > 2.0	<1.3 or > 3.0	< 1.7 or > 4.5	Work to be rectified	
Initial Seals ⁽²⁾	N/A	1.0 to 2.0	1.2 to 3.0	N/A	Accept	
	N/A	< 1.0 or > 2.0	< 1.2 or > 3.0	N/A	Work to be rectified	
Surface Enrichment ⁽¹⁾	N/A		0.8		Accept	
	N/A		< 0.8		Work to be rectified	
DOUBLE/DOUBLE TREATMENTS						
Treatment	Mean Texture Depth (mm)					Action Required
	Size 10/5	Size 10/7	Size 14/5	Size 14/7	Size 20/7	
Seals (All Types) ⁽¹⁾	1.3 to 2.1	1.3 to 2.2	1.3 to 2.4	1.3 to 2.4	1.4 to 2.5	Accept
	1.2 to 1.3 or 2.0 to 2.3	1.2 to 1.3 or 2.1 to 2.4	1.2 to 1.3 or 2.4 to 2.7	1.2 to 1.3 or 2.4 to 2.7	1.3 to 1.4 or 2.5 to 2.8	Work to be rectified. The Superintendent may require rectification of the works or elect to reduce payment for the lot by \$1.00/m ²
	<1.1 or >2.3	<1.1 or >2.4	<1.2 or >2.7	<1.2 or >2.7	<1.3 or >2.8	Work to be rectified
Initial Seals ⁽²⁾	1.0 to 2.0	1.0 to 2.0	N/A	N/A	N/A	Accept
	< 1.0 or > 2.0	< 1.0 or > 2.0	N/A	N/A	N/A	Work to be rectified

Notes: (1) Surface texture measurements for sprayed seals and surface enrichment may be undertaken at any time during the Defects Liability Period, but final acceptance of works is not affected until the end of the Defects Liability Period.

(2) Surface texture measurements for initial seals shall be undertaken between 10 and 15 weeks after placement. If tests are not undertaken in this period and later test results require the works to be rectified, the later test results are to be used for acceptance of the works.

(c) Aggregate Retention

Acceptance of work for aggregate retention shall be based on visual assessment. However, in marginal cases the Superintendent Council may request that nominated areas be tested in accordance with the VicRoads Test Method RC 317.03 and assessed in accordance with Table 408.153. Depending on the measured Degree of Aggregate Stripping, the Contractor shall take action as specified in Table 408.153. The test lot size shall not be less than 100 m of single traffic lane or more than 600 m of single traffic lane. For any testing undertaken on areas other than within traffic lanes, the minimum lot size shall be not less than 400 m² or more than 2500 m².

Table 408.153 Assessment of Aggregate Retention

Degree of Aggregate Stripping	Action Required
0 to 2	Accept
3 to 5	Work to be re-tested within one month prior to the end of the Defects Liability Period. If the Degree of Aggregate Stripping has increased since it was last tested, the work shall be rectified before the end of the Defects Liability Period.
Greater than 5	Work shall be rectified within 5 days.

Note: Aggregate retention measurements may be undertaken at any time during the Defects Liability Period, but final acceptance of works is not affected until the end of the Defects Liability Period.

(d) Visual Uniformity

The Contractor shall provide a surface with uniform colour and texture to provide a consistent appearance for each job item. Any aggregate used for repairs and/or remedial works shall be supplied from the same source.

408.16 MAINTENANCE OF SEALS

The Contractor shall be responsible for the monitoring and maintenance of seals from the time of application until the end of the Defects Liability Period. Monitoring of seals shall include regular and timely inspection of work, management of traffic and monitoring of any deterioration in the surface condition.

The Contractor shall carry out any work necessary to protect and maintain the seal or to effect repairs to any seal failure. Such failures include but are not limited to emulsification, flushing, bleeding, fatty areas, significant areas of bitumen on kerb and channel, excess bitumen without aggregate cover, aggregate stripping, non-uniform aggregate spreading and streaking of binder but do not include pavement failures or events beyond the reasonable control of the Contractor.

HP ~~The Contractor shall advise the Superintendent Council in writing of the proposed treatment to affect the above work before undertaking the work.~~

HP ~~The Contractor shall obtain the agreement of the Superintendent Council of the proposed treatment before undertaking the work.~~

The Contractor shall undertake the protection or repair work within 48 hours of notification by ~~the Superintendent Council~~. The Contractor shall be responsible for the installation and maintenance of appropriate traffic management as approved by ~~the Superintendent Council~~ until the repairs are completed.

For urgent repairs, the Contractor shall take action to preserve the work and make the road safe within 48 hours of being notified or becoming aware of the defect.

~~Payment will be made for the cost of repairs undertaken by the Contractor and approved by the Superintendent for damages that are the result of incidents outside the Contractor's control, including but not limited to, damage caused by others involving oil spills, accidents, vehicle fire or tearing due to heavy braking and skidding.~~

408.17 RECORDS

The Contractor shall forward to ~~the Superintendent Council~~ a Job Completion Report (Sealing) using the proforma included as Attachment A to this Section 408, or an equivalent proforma as approved by ~~the Superintendent Council~~, for each job item in Schedule 1. The completed form shall be submitted within seven days of completion of sealing each job.

The Contractor shall ensure that where a representative of ~~the Superintendent Council~~ is on site during the works, that officer validates the works as provided on the Job Completion Report (Sealing).

The Contractor shall carry out at least two inspections of each job during the Defects Liability Period and provide a condition report to ~~the Superintendent Council~~. The condition report shall detail the condition of the seal, any defects and the proposed corrective action.

408.18 DEFECTS LIABILITY PERIOD

All defects shall be rectified ~~six months~~ prior to the conclusion of the Defects Liability Period, to an agreed corrective action. This does not limit the Contractor's responsibility to undertake protection or urgent repair works under clause 408.16. ~~The Defects Liability Period for repaired work shall recommence on the date of repair in accordance with the provisions of the Contract.~~

408.19 SCHEDULE OF DETAILS

Table 408.191 Schedule of Details

Job Item (refer Sch 1)	Freeway, Highway or Road Name	Map Ref VicRoads/ Melway Directories		Chainage km	Approx Length m	Approx Width m	Approx Area m ²	Treatment Type (2)	Treatment Description (3)	Single or Two Application (4)	Agg Sizes mm	Min Agg Class (A, B or C)	Traffic Data			Default Binder Rates of Application L/m ²	Pre-treat Y/N?	Other Requirements
		Road No. (and Linking Victoria Classification)	Map & Ref (1) or GPS Coordinates. (1)										24 hr AADT (5)	% EHV	24 hr AADT/ Lane (6)			
## Note to author - The following items are examples only. Change text to suit your specification - DELETE THIS ROW BEFORE PRINTING:																		
1	Birchip-Rainbow Road	5432 (C243)	100-G7	7.00-8.00	1000	7.4	7400	FS	C	S	10	B	1400	15	700	1.3		
2	Western Highway	2520 (A8)	150-B6	161.0-162.0									12000	15	see under			
	2.1 Lane 1 (slow lane)			161.0-162.0	1000	3.7	3700	R	GRS	D	14/7	A			4500	2.4	Min. PSV of ##: is required for aggregate	
	2.2 Lane 2 (passing lane)			161.0-162.0	1000	3.7	3700	R	SAM	S	14	A			1500	1.8	PMB Class ##: is required	
	2.3 Lane 3 (reverse direction)			161.0-162.0	1000	3.7	3700	R	HSS	S	10	A			6000	1.5		
	2.4 Shoulders x 2			161.0-162.0	1000	2 x 2.4	4800	R	SE	S	N/A	N/A			≤50	0.8		
3	Mallee Highway	2650 (B12)	11-C3	120-121	1000	7.4	7400	R	SAM	S	14	B	1000	10	500	1.6		

If any space is left blank it shall be read as "Not Applicable".

Notes on Table 408.191

- (1) The map references refer to either the Melway Street Directory or the VicRoads Country Directory. GPS Coordinates refer to the start of the section travelling in the direction of increasing road chainage.
- (2) Treatment Type - Prime Only (PO), Initial Seal (IS), Prime and Seal (P&S), Final Seal (FS), Reseal (R) Surface Enrichment (SE).
- (3) Treatment Description - Conventional (C), Single/Single High Stress Seal (HSS1), Double/Double High Stress Seal (HSS2), Extreme Stress Seal (XSS), Strain Alleviating Membrane (SAM), Strain Alleviating Membrane Interlayer (SAMI), Geotextile Reinforced Seal (GRS), Fibreglass Reinforced Seal (FRS).
- (4) Single or Two Application - Single(S) or Double Application (D) of Binder and Aggregate.
- (5) AADT is the Annual Average Daily (24 hr) Traffic and % EHV is the percentage of the AADT calculated from number of heavy vehicles and large heavy vehicles.
- (6) AADT / lane is the Average Annual Daily (24 hr) Traffic for the traffic lane being considered. Where this is not given it shall be proportioned by the Contractor from the AADT figures.
- (7) Typical 'Other Requirements' include: Specific PMB Class (Cl. 408.08 & Cl 408.10), Aggregate PSV >48 (Section 831), If plant precoated aggregate is specifically required (Cl. 408.11), Need for gritting of trafficked areas for Prime Only treatments (PO), Notification to abutting landowners, Placement of variable message boards or other additional advisory signs, suction sweeper required (Cl. 408.12), Specific programming requirements.

Table 408.192 – Stacksite Locations

Stacksite ID:	Map Reference ⁽¹⁾			Location and General Description	Additional Restrictions on Use and Cleaning Up of Stacksites
	Map No.	Grid Ref.	GPS Coord.		
##Note to author. The following items are examples only. Change text to suit your specification. DELETE THIS ROW BEFORE PRINTING:					
4	400	G8		Birchip Rainbow Road approx. 9.0 km / north side	Powerlines exist on site, Vehicles not to enter no go zones and to leave protective earth bund in place when cleaning site.
N/A				Contractor to obtain approval to selected stacksite	Remnant aggregate shall be removed from the stacksite within 2 weeks rather than 4 weeks.

Notes to Table 408.192

(1) The Map References refer to either the Melway Street Directory or the VicRoads Country Directory.

(2) GPS coordinates where provided refers to Stacksite entrance.

ATTACHMENT A TO SECTION 408

JOB COMPLETION REPORT (SEALING)

CONTRACT No.

JOB SPECIFICS	
Job No: _____	Treatment: _____
Road Name: _____	Seal Date: _____
Start Chainage: _____	Stacksite Location: _____
End Chainage: _____	

EXISTING CONDITIONS (circle or fill in)						
Weather:	Sunny	Clear	O'Cast	Windy	Showers	Wet
Air Temp:			Pavement Temp:			
Pavement:	Isolated stone loss	stripping	flushed wheel paths	flushed	patching	cracking
Regulatory Speed Limit:	100 km	80 km	60 km	40 km	< 40 km	other
Aggregate Conditions:	clean	dry	dusty	dirty	damp	wet
Aggregate Pre-coat:	pre-delivery	onsite	no pre-coat			
NCR Required?	Yes	No	Reasons:	NCR No:		

TRAFFIC CONTROL (circle or fill in)						
Subcontractor Managing Traffic Control?			Yes / No	Subcontractor:		Subcontractor Initials:
SIGNS						
During Work	Installed to WTM Code	Yes / No	Date / Time Installed:	Speed Limit _____ km/hr		
	Removed	Yes / No	Date / Time Removed:	TMP No. Used _____		
After Work	Installed to WTM Code	Yes / No	Date / Time Installed:	Speed Limit _____ km/hr		
	Removed	Yes / No	Date / Time Removed:	TMP No. Used _____		
Traffic	Delays	Average Delay to Vehicles: _____ minutes				
	Queues	Average Queue Length: _____ vehicles				

SEALING WORKS						
RUN NO.	Pre-treatment / Run 1	Run 2	Run 3	Run 4	Run 5	Totals
Start Chainage						
End Chainage						
Lane Description						
Air Temperature						
Pavement Temperature						
Length (m)						
Width (m)						
Area (m ²)						
Binder Type						
Tank Dip Start (litres)						
Tank Dip End (litres)						
Quantity Sprayed (litres)						
Actual Application Rate (L/m ²)						Average
Design Application Rate (L/m ²)						Average
Mix - Bitumen/Flux Oil/Cutter/Additive	100 / / /	100 / / /	100 / / /	100 / / /	100 / / /	

AGGREGATE						
Aggregate Size						
Quantity (m ³)						
Average Least Dimension (ALD)						
Aggregate Design Spread Rate (m ² /m ³)	/ ALD	/ ALD	/ ALD	/ ALD	/ ALD	
Actual Design Spread Rate (m ² /m ³)	/ ALD	/ ALD	/ ALD	/ ALD	/ ALD	
Rolling Time (hrs)						

FORWARD AGGREGATE SPREADING PLANT						
Proportion of forward aggregate spreading use on run (e.g. 1/3, 4/5, All)						

DELINEATION	Existing RRPMS	Removed	Yes / No	Date:	
	TRRPMS	Installed	Yes / No	Date:	Spacings: _____ m
		Uncovered	Yes / No	Date:	
	Reinstatement	Pavement Markings - 1 st Coat		Specified Date Due:	
		Pavement Markings - 2 nd Coat		Actual Date Done:	
	RRPMS			Specified Date Due:	
				Actual Date Done:	
Weather Delays to Linemarking: _____ days			Actual Date Done:		

I, certify the above details as correct
(Contractor's Representative, print name)

..... / /
(Contractor's Representative, signed)

I, concur with the above
(Superintendent/Council's Representative, print name)

..... / /
(Superintendent/Council's Representative, signed)