SECTION 431 - COLOURED SURFACE TREATMENTS

~~##This section cross-references Sections 175 and 721.~~
~~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:~~

431.01 GENERAL

This section covers the requirements for the supply and placement of coloured surface treatments.

431.02 DEFINITIONS

The following definitions apply to the coloured surface treatment clauses:

Accelerant

Accelerant refers to any material used to reduce the curing time of the binder.

Aggregate

Aggregate refers to any natural or synthetic particles used as a cover material applied to the binder, to provide a coloured and textured skid resistant surface.

Aggregate Coating

Aggregate coating includes all materials used to cover and/or colour aggregate.

Aggregate Retention

Aggregate retention refers to the ability of the binder to adhere and retain the aggregate under traffic and maintenance activities.

Binder

Binder refers to any resin used to bond the aggregate to the existing road surface.

Cleaning Agents

Cleaning Agents include all materials used to remove dirt, grime, fuel, oil and other materials from the existing surface.

Coloured surface treatment

Coloured surface treatments provide a trafficable surface that is coloured for enhanced delineation for specific road uses. The treatment consists of a coloured binder applied to the existing road surface, and coloured aggregate spread over the binder surface. A coloured surface treatment may include an additional layer of coloured binder or protective sealer over the aggregate layer.

Delamination

Delamination refers to failure of the binder and aggregate to adhere to the existing pavement surface.

Polished Stone Value

The Polished Stone Value (PSV) of an aggregate is a friction rating derived from test results. Measure of the aggregate's resistance to polishing shall be determined in accordance with VicRoads Test Method RC374.01.

Priming Material

Priming material refers to any substance used to clean and prepare the existing road surface for the application of binder and improve the adhesion of the binder to the existing roadway.

Protective Sealer

Protective sealer refers to any substance used to protect and seal the coloured surface treatment.

Sideways Force Coefficient (sfc)

Sideways force coefficient, also called sideways friction coefficient, is a general term for the ratio of the resistance to sideways motion to the normal component of force between the tyres of a vehicle and the road surface when using sideway force test equipment.

Skid Resistance

Skid resistance is the friction between the vehicle tyre and the pavement surface. Skid resistance shall be measured using one of the following methods:

(a) with a Sideways Force Coefficient Routine Investigation Machine (SCRIM ®), tested in accordance with VicRoads RC421.02; or

(b) a portable pendulum friction tester, tested in accordance with AS 4663 – Wet method.

Note: SCRIM ® is a registered trademark of WDM Limited.

Surface Texture

The mean height of aggregate particles above the level of the binder as determined by the VicRoads test for surface texture testing as listed in Section 175.

Test Lots

Acceptance of work and materials shall be based on testing of the work or material in lots. A lot will consist of a single batch or area of like work which has been constructed under uniform conditions and is essentially homogeneous with respect to material and appearance. A lot shall be the lesser of either one day's production or each 500 m^2.

431.03 MATERIALS

(a) Binder

The binder shall be:

(i) resistant to fuel and oils spills from traffic

(ii) non flammable after placement and curing on road surface

(iii) able to be swept using a mechanical broom and cleaned with high pressure water without damage

(iv) free from lead and other heavy metals

(v) Stable in UV light

(vi) capable of providing strong adhesion between the existing surface and the aggregate to achieve a uniform surface.

Thermoplastic and paint binders are not permitted.

The following primer and binder details shall be provided to ~~the Superintendent~~ Council at least 14 days prior to the start of works:

(i) priming materials type and source

(ii) binder type and source

(iii) manufacturer's recommendations/instructions for priming material supply and placement

(iv) manufacturer's recommendations/instructions for binder mix quantities and tolerances on mixing components

(v) manufacturer's recommendations/instructions for mixing of binder and components

(vi) manufacturer's recommendations/instructions for pot life of binder, i.e. time of mixing to time of spreading

(vii) manufacturer's recommendations/instructions for placement of binder including application rates and tolerances and placement temperatures

(viii) manufacturer's recommendations/instructions for curing

(ix) manufacturer's recommendations/instructions for accelerants (if applicable)

(x) manufacturer's recommendations/instructions for supply and placement of protective sealers

(xi) type of coloured pigment.

(b) Aggregate

The aggregate shall be clean, free from dirt, clay and organic matter, of uniform shape and quality, resistant to fuel and oils spills from traffic, able to withstand traffic stresses without damage, and able to be swept using a mechanical broom and cleaned with high pressure water equipment without damage.

The aggregate may be pigmented to provide a colour match of the final product.

The following aggregate details shall be provided to ~~the Superintendent~~ Council at least 14 days prior to the start of works:

(i) aggregate type, source and gradation

(ii) manufacturer's or Contractor's recommendations/instructions for placement of aggregate including spread rate

(iii) Polished Stone Value (PSV) – aggregates shall have a minimum PSV of 54.

431.04 PRODUCT PERFORMANCE

Documented evidence of satisfactory performance over at least 5 years for the coloured surface treatment in a heavy urban traffic environment shall be provided with the Tender. The documentation may include references from clients, details of sites with the coloured surface treatment, evidence of texture with time, evidence of skid resistance with time, evidence of colour retention with time, evidence of durability with time.

~~The Superintendent~~Council may request additional information regarding performance of the proposed coloured surface treatment and shall determine if the documented evidence is satisfactory. Only products with satisfactory documented evidence will be considered for award of the works.

~~The Superintendent~~Council may require a sample of the material to be provided. The sample shall be a minimum size of 300 mm x 300 mm which is representative of the material to be applied.

Acceptance of the documented evidence and acceptance of the proposed coloured surface treatment does not guarantee the performance of the coloured surface treatment, and does not relieve the Contractor from any performance requirements.

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

431.05 OFFENSIVE ODOUR

The coloured surface treatment shall not emit offensive odours after opening to traffic. ~~The Superintendent~~ Council shall determine if the coloured surface treatment is producing offensive odours.

Any coloured surface treatment which is deemed to be unacceptable shall be rectified with the agreement of ~~the Superintendent~~ Council.

431.06 MATERIAL SAFETY DATA SHEETS

Copies of Material Safety Data Sheets (MSDS) for priming materials, binders, aggregate coatings, protective sealers and any other work materials shall be provided to ~~the Superintendent~~ Council prior to the start of works. Any requirements for environmental protection measures as recommended by the material manufacturer shall be undertaken.

All materials shall be used and stored in accordance with the manufacturer's instructions, and MSDSs.

431.07 SITE PREPARATION

All loose material, grit, stones, vegetative matter, and rubbish shall be removed from the area of works prior to placement of the coloured surface treatment.

The site may be further cleaned and prepared as required. Cleaning and preparation shall not cause structural damage to the pavement. All cleaning agents and collected material shall be removed from site and disposed in accordance with Environment Protection Authority (EPA) Victoria requirements for the type of waste generated.

Existing pavement markings shall be masked to ensure the coloured surface treatment is not applied to the markings.

All Raised Reflective Pavement Markers (RRPMs) shall be removed from the area of works prior to any coloured surface treatment being placed. New RRPMs shall be reinstated after the application of the coloured surface treatment.

Service pits and valve covers less than 0.03 m2, and drainage grates and frames shall also be masked. Larger pit and valve covers shall be covered with the coloured surface treatment. All lifting mechanisms and joins between the lid and frame shall be masked and protected such that the coloured surface treatment does not impede lifting and replacing lids.

Any damage caused to the surface by the removal of pavement markings and RRPMs shall be repaired prior to placement of the coloured surface treatment.

HP ~~The Superintendent~~Council shall agree to the method of removal and any pavement repairs for pavement markings and RRPMs prior to these works occurring.

All pavement markings covered by the application of coloured surface treatments shall be reinstated in accordance with Section 721. This shall also apply to any pavement markings or RRPMs which are covered partially or wholly by the coloured surface treatment due to inadequate masking.

431.08 PLACEMENT

Coloured surface treatments shall be applied to produce a visually uniform coloured and textured surface. The edges of the work shall provide a neat and clean line onto the adjacent surface.

HP Coloured surface treatments shall not be placed until Council agrees that the prepared road surface is ready for surfacing.

(a) Priming Materials

Priming materials where used shall be applied uniformly over the site. The application rate for each lot of material shall be determined by mass or volume divided by the area and result recorded. All application rates for the work shall be provided to ~~the Superintendent~~ Council.

(b) Binder

Binder shall be spread to provide a uniform coverage and thickness over the site and in accordance with the manufacturer's recommendations. The spread rate for each lot of material shall be determined by mass or volume divided by the area, and the result recorded. All application rates for the work shall be provided to ~~the Superintendent~~ Council.

(c) Aggregate

Aggregate shall be spread to provide a uniform thickness over the site. The spread rate for each lot of material shall be determined by mass or volume divided by the area, and the result recorded. All application rates for the work shall be provided to ~~the Superintendent~~ Council.

(d) Temperature

The pavement temperature of the site shall be measured and recorded at least every 2 hours during the works. The temperature shall be measured using an infrared temperature gauge accurate to +/-2˚C. The temperature results shall be provided to ~~the Superintendent~~ Council. All materials shall be placed within any temperature limits recommended by the manufacturer.

(e) Accelerants

Accelerants may be used to reduce the time of curing for the coloured surface treatment. The application rate for each lot of material shall be determined by mass or volume divided by the area, and the result recorded. All application rates for the work shall be provided to ~~the Superintendent~~ Council.

431.09 SCHEDULE OF DETAILS

The details for each site of works for coloured surface treatments are shown on the drawings ~~detailed in Table 431.091~~.

~~*** Table 431.091 Schedule of Details~~

~~Job No~~	~~Road Name~~	~~Map Ref~~	~~Location~~	~~Approx Area (m^2)~~	~~24 hr AADT~~	~~Other requirements~~
~~##:~~	~~##:~~	~~##:~~	~~##:~~	~~##:~~	~~##:~~	~~##:~~

~~No additional payment or deduction shall be made where the measured total area of each job falls within 2.5% of the listed area.~~

431.10 CLEAN-UP

All excess material shall be removed from the site and disposed in accordance with EPA requirements.

All masking shall be removed prior to opening the site to traffic.

Excess aggregate shall be removed from the finished surface prior to opening the site to traffic. Excess aggregate shall be removed from the roadway, kerb and channel, driveways and any adjacent trafficked and un-trafficked areas prior to opening to traffic.

HP ~~The Superintendent~~Council shall agree the site is neat, tidy and free of excess aggregate prior to opening to traffic.

All material which becomes loose after the initial clean-up shall be removed at 24 hours, 3 days and 14 days after placement.

431.11 ACCEPTANCE OF WORK

Coloured surface treatments shall provide a visually uniform surface with uniform aggregate retention, and be free from delamination, stripping and areas of wear/scuffing.

Any work that fails to meet the minimum requirements shall be rectified.

Acceptance of work shall be on a lot basis. Discrete portions of a lot which are non-homogeneous with respect to material and appearance shall be excluded from the lot and either treated as separate lots, or replaced. Where the areas excluded from a lot as non-homogeneous exceed 20% of the total lot area, the whole of the lot shall be rejected.

(a) Surface Texture

Acceptance of work for surface texture shall be based on visual assessment, however in marginal cases ~~the Superintendent~~ Council may request that nominated areas be tested in accordance with the test method for assessment of surface texture testing as listed in Section 175.

A lot will consist of a single batch or area of like work which has been constructed under uniform conditions and is essentially homogeneous with respect to material and appearance. A lot shall be the lesser of one day's production or each 500 m^2.

The surface texture of each test site within the lot shall be a minimum of 0.6 mm.

(b) Skid Resistance

~~The Superintendent~~Council may require that the work be tested and assessed for skid resistance using one of the following methods:

(i) SCRIM ®

The length of the entire site shall be tested using SCRIM ® in the left and right wheel paths in every through traffic lane of the site. The site shall be tested within 4 weeks of initial placement, and within 8 weeks prior to the end of the defects liability period. Council may undertake additional skid resistance testing of the site at any time during the defects liability period.

The skid resistance of the coloured surface treatment shall be a minimum of 0.55 sfc at any time during the defects liability period.

(ii) Portable Pendulum Friction Tester

The coloured surface treatment shall be tested using a pendulum friction tester in accordance with AS 4663 – Wet method. Each lot shall have 5 randomly selected test locations selected in accordance with VicRoads test method RC316.10 – Selection of test sites within a lot.

Each lot shall achieve a minimum mean British Pendulum Number (BPN) of 55 with no individual test location having a BPN of less than 50 at any time during the defects liability period.

The method selected to assess skid resistance shall be the most practical for the extent and size of work. ~~The Superintendent~~Council may require testing at any time prior to the end of the defects liability period.

Skid resistance testing will be undertaken at the ~~Superintendent's~~ Contractor's cost.

(c) Colour

The colour of the finished surface shall be a Rating 3 Approximate Match (or better) with one of the following Australian Standard 2700 - 2011 colours as listed in Table 431.111.

The initial colour shall be measured in accordance with Australian Standard 1580.601.1:1995. Each lot of material shall be tested within 2 days of placement. Testing shall be undertaken onsite and under daylight conditions only. Each lot of coloured surface treatment shall provide a Rating 3 Approximate Match (or better) with adjacent lots.

Table 431.111 Colour Requirements

Use	AS2700S - 2011 Colour
Bus Lanes (Nominally Red)	**Preferred Colour** R54 – Raspberry **Acceptable Alternatives** R14 – Waratah R15 - Crimson
Bicycle Lanes (Nominally Green)	**Preferred Colour** G13 – Emerald Green **Acceptable Alternatives** G16 – Traffic Green G23 - Shamrock

The same consistent colour shall be used along a continuous route or within a given locality.

431.12 MAINTENANCE AND REPAIRS

The Contractor shall be responsible for monitoring and maintenance of the coloured surface treatment from the time of placement, until the end of the defects liability period.

The Contractor shall carry out any works necessary to protect and maintain the surface, and repair all surface failures, including loss of aggregate, bleeding, fatty areas, flushing, loss of skid resistance, and delamination from the existing surface.

The Contractor is not responsible for defects caused by either settlement or failure of the existing pavement, or for damage (including gouging and vehicle fire) and repairs to the surface caused by traffic incidents.

Areas of delamination less than 0.01 m^2 are not required to be repaired, unless the total of defective areas exceeds 1% of the total area. Areas of defect shall be agreed with ~~the Superintendent~~ Council. Defective areas of coloured surface treatment shall be squared-up and removed and replaced.

Repairs shall be undertaken within 4 weeks of notification by ~~the Superintendent~~ Council. Urgent repairs shall be started onsite within 24 hours of notice by the Superintendent Council.

~~HP~~ **The Contractor shall advise ~~the Superintendent~~ Council in writing of the proposed treatment for any repairs before undertaking the work.**

431.13 EXCLUDED AREAS

The following areas are excluded from the limits of work:

- all service pits and valve covers less than 0.03 m^2
- traffic detector loops
- pedestrian crossings – the white pavement markings and designated travel path of pedestrians.