



PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

1. SCOPE

- a) This specification applies to Coloured Surface Treatments (CSTs) for use as a pavement marking material.
- b) This document is prepared in a manner compliant with the requirements of AS/NZS ISO/IEC 17065.
- c) This type of pavement marking material is applied to bituminous and concrete road surfaces, specifically in bus and bicycle lanes, in threshold treatments for schools, wildlife conservation areas and entries into towns.
- d) Safe use of these pavement surfaces is facilitated through:
 - i. Brightly coloured binders and aggregate.
 - ii. Introduced order on roads, car parks, and public spaces.
 - iii. Delineation of roads.
- e) APAS® is a trademark registered with IP Australia, owned by CSIRO, the Scheme Owner, and protected under applicable laws. Use of the trademark or the Certification Scheme is prohibited unless prior approval in writing is obtained from CSIRO via the APAS Secretariat.

2. BACKGROUND

- a) To obtain a broad overview of the Australian Paint Approval Scheme (APAS), refer to APAS document AP-D001.
- b) To obtain an overview of restricted ingredients in APAS certified products, refer to APAS document AP- D123.
- c) To obtain the current list of APAS participating manufacturers (and suppliers) and resellers, refer to APAS document AP-D152.
- d) To obtain an overview of how to participate in the APAS, refer to APAS document AP-D177.

3. DESCRIPTION AND GUIDE FOR USERS

3.1 General Requirements

- a) Pavement marking materials are used by road authorities to:
 - i. Improve road safety and other surfaces used to carry all types of traffic including cars, trucks, pedestrians, cyclists, buses, and aircraft.
 - ii. Provide delineation, acting as a guide to drivers to maintain their respective lane position, deterring accidents and providing direction.
- b) Because of these functions, CSTs must withstand many different types of wear and still perform as required.
- c) When selecting a CST, several performance factors should be considered including, but not limited to, the roadway surface (i.e., smooth, or rough), heat sensitivity, porosity, traffic volume, and environmental conditions.
- d) CST durability is dependent on many factors including, but not limited to, traffic volume, location of the CST markings, application rates, skid and slip resistance, performance of the material under various traffic conditions, application location and individual product durability.
- e) CSTs are used in areas such as, but are not limited to:
 - Bicycle lanes, particularly in areas with poor safety records, and bicycle facilities.
 - Bus lanes.
 - Approach to school zones.
 - Wildlife conservation areas.
 - Entries into townships where speed limits drop from high speeds i.e., 100+ km to lower speeds i.e., 40-60 km, called Township Entry Treatments (TETs).
 - Loading zones.
 - High turnover curb-side parking.
 - Busy, high volume &/or complex intersections (approach &/or departure).
- f) CSTs can be cold applied plastics, 2-pack epoxies, urethanes, resin bonded to pre-coloured aggregate, water-based or solvent-free. The aggregate used in CSTs can be coloured to match the binder if applied over the binder so as both materials wear over time, the coloured aggregate enhances the colour retention. If a smaller size aggregate is used and encapsulated in the binder, this requirement is not essential.
- g) The aggregate used with CSTs must be:
 - Clean, and free from dirt, clay, and organic matter.
 - Natural aggregate/sand, calcined bauxite, glass particles, or manufactured aggregate.
 - Uniform shape and quality.
 - Fuel and oil resistant.
 - Hard, tough, and durable.
- h) Due to the nature of CSTs, the expected lifespan of an application in relation to colour, material retention and texture, and skid resistance is between 5 to 10 years, dependent on location and traffic volume. For example, a heavily trafficked urban environment would be expected to have a 5-year+ lifespan.

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3. DESCRIPTION AND GUIDE FOR USERS (Cont.,)

3.1 General Requirements (Cont.,)

- i) CSTs, once placed and cured, **must** have the following specific properties:
- Able to withstand the action of traffic i.e., acceleration, braking, turning, scrubbing forces without damage, and
 - Resistant to fuel and oil spills, and
 - Resistant to fading and chemically stable under prolonged exposure to UV and visual light, and
 - Non-flammable, and
 - Free from offensive odours, and
 - Able to be swept using a broom &/or a mechanical street sweeper and cleaned with high pressure water without damage, and
 - Free from any environmental contaminants i.e., lead, chromate & heavy metals, and
 - Be of adequate thickness for the intended end purpose, and
 - Capable of providing strong adhesion to the aggregate and substrate and achieve a uniform appearance.
- j) CSTs are typically applied in one (or more) continuous layer by either roller, brush, screed, squeegee or spray at a uniform rate and thickness.
- k) CST failure can occur due to many factors, including choice of an incorrect product for the substrate type, poor surface preparation, moisture content in the substrate, underlying substrate damage, application to insufficiently cured substrate, unsuitable application temperatures and environmental conditions or incorrect/poor application. Typical modes of failure viewed include, but are not limited to:
- Delamination:** Failure of the binder and aggregate to adhere to the road substrate.
 - Raveling:** Progressive disintegration or loss of surface aggregate that has been in contact with or embedded in the binder.
 - Stripping:** Loss of aggregate from the CST caused by action of traffic, usually in the presence of water.
 - Wear:** The damage that comes from normal use and aging sustained through its working life.
 - Loss of skid resistance:** Aggregate polishing &/or breakdown on the CST surface.
- l) CSTs are used in a variety of road and pavement marking applications with colours specifically oriented to the AS 2700, depending on the Australian geographical location. Typical applications and colours include, but are not limited to:
- Red:** Bus lanes, township entry treatments and off-road bicycle facilities; R13 Signal Red, R14 Waratah, R15 Crimson, R53 Redgum, R54 Raspberry, or R62 Venetian Red.
 - Green:** On-road bicycle lanes and wildlife conservation areas; G13 Emerald Green, G16 Traffic Green, G23 Shamrock, or G27 Homebush green (G26 Apple Green and G36 Kikuyu are also used in New Zealand).
 - Blue:** Disability Car Parks; B24 Harbour Blue, or B21 Ultramarine.
 - Yellow:** Pedestrian crossings/walks and off-road bicycle facilities; Y11 Canary, Y12 Wattle, Y13 Vivid Yellow, Y14 Golden Yellow, or Y42 Mustard.
 - Terracotta:** Local area traffic management and calming areas; R42 Salmon Pink, R43 Red Dust, or R52 Terracotta.
 - White:** Pavement markings and pedestrian crossings and lettering; N14 white.
 - Black:** School zones; B64 Charcoal, or N61 Black.
- m) CSTs have good adhesion to both new and existing clean, dry, bituminous, and concrete surfaces that have been adequately prepared by the removal of all raised pavement markers (RPMs), oil, grease, dirt, and foreign bodies. Dependent on the material selected for use and the substrate for application to, a primer may be required to aid in adhesion.
- n) New concrete and bituminous surfacing must be allowed to adequately cure prior to the application of a CST. A contractor's procedure or quality plan is required prior to CST application to ensure substrate curing periods have been adequately met. The required period a surface must remain open prior to a CST being applied must also be clearly defined by the manufacturer on their Product Data Sheet (PDS) or Technical Data Sheet (TDS).
- o) It is not recommended to apply CSTs to open graded asphalt (or roads with lots of defects i.e., oxidized, cracked etc.), unless otherwise specified, as this substrate type is designed to have a higher permeability to allow water drainage through the substrate. Application of CST to this substrate type hinders this process, compromising the capabilities of the substrate.
- p) The specification has been prepared in consultation with the Department of Transport and Main Roads Queensland, Transport for New South Wales, Department of Transport and Planning Victoria, Mainroads Western Australia, and the Roadmarking Industry Association of Australia.

3.2 Sub-classes

- a) This specification does not incorporate any sub-classes.

3.3 Basis of this specification

- a) This specification is based primarily on AS 4049.4, AS 4049.5, industry standards and specifications, and road authority standards and specifications.



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4. DEFINITIONS AND ACRONYMS

4.1 Definitions

The definition of terms used in this document and in the Certification Scheme can be found in APAS document AP-D001. In addition, the following definitions within this document shall apply:

- a) **Agency for Conformity Assessment:** An organisation or testing authority, recognised by APAS, that is either part of the Clients Recognised Manufacturing Unit (RMU) and perform all the required tests, or a specialist laboratory contracted either by the APAS Secretariat or by the Client, to carry out specific tests that are beyond the capability of the Client RMU.
- b) **Aggregate:** Any natural or synthetic particles used in combination with the binder to provide a coloured and textured skid resistant surface. Aggregate may be pre-coloured or covered in a coating matched to the binder to enhance the colour. Aggregate examples include, but are not limited to, calcined bauxite, crushed glass, natural sand, crushed aggregate sourced from quarry and metler slag.
- c) **Binder:** Resin used to bond aggregate to the existing road surface; may be two (or more) thermosetting components (or alternative binder types) suitably pigmented to provide necessary colour in the finished surface coating.
- d) **Certification Scheme:** The Certification system related to specified products (Paint, Surface Coating Materials and Non-Paint Products) to which the same specified requirements, specific rules and procedures apply. APAS is the applicable Certification Scheme.
- e) **Coloured Surface Treatment:** A high durability and coloured surface coating material or pavement treatment consisting of a binder and fine uniformly graded aggregate (this may also include an additional layer of coloured binder or protective seal over the aggregate) that is applied to pavement surfaces to provide enhanced delineation, skid resistance, and increase awareness of drivers, bicycle and motorcycle riders and pedestrians.
- f) **Delamination:** Failure of the binder and aggregate to adhere to the road substrate.
- g) **Glass Beads:** Transparent, clear, colourless, smooth and spherical glass balls used to provide visibility at night, in conjunction with pavement marking materials, by retroreflecting a vehicle headlight beam back towards the driver.
- h) **Glass Particles:** Small pieces or fragments of glass, typically irregularly shaped, can be of virgin or recycled origin, used primarily for the provision of skid and slip resistance in place of traditional aggregate; can also be referred to as crushed glass, silica, silicon dioxide, fused quartz, sodium carbonate, pot ash or similar.
- i) **Pavement Markings:** All longitudinal line markings, transverse line markings and pavement messages for the purpose of guiding traffic and road delineation.
- j) **Primer:** A substance used to prepare the existing pavement surface prior to application of the binder; used to improve the adhesion of the binder to the existing road surface.
- k) **Protective Sealer:** A substance used to protect and seal the CST from fuel and oil spills.
- l) **Raveling:** Progressive disintegration or loss of surface aggregate that has been in contact with or embedded in the binder.
- m) **Skid Resistance:** The measure of the friction between the vehicle tyre and the paved surface; it is dependent on both the micro texture (surface texture of individual aggregate particles in bituminous surfaces or fine aggregate in concrete) of the aggregate in the surfacing and the macro texture (surface texture - shape and space between aggregate) of the surfacing as well as presence of moisture and film thickness.
- n) **Slip Resistance:** Frictional force opposing movement of an object across a surface, usually with reference to a sole or heel, of a pedestrian surface.
- o) **Slip Resistance Value:** Slip resistance classification of new pedestrian surface materials.
- p) **Scheme Owner:** The organisation responsible for developing and maintaining the certification scheme. CSIRO is the APAS Scheme Owner.
- q) **Secretariat:** The organisation that provides administrative support and other resources necessary to keep the Certification Scheme functioning. The Secretariat is vested in CSIRO.
- r) **Stripping:** Loss of aggregate from the CST caused by action of traffic, usually in the presence of water.

4.2 Acronyms

| | |
|-------|--|
| ACE | Agency for Conformity Assessment |
| APAS | Australian Paint Approval Scheme |
| CRCL | CSIRO Recognised Competent Laboratory |
| CST | Coloured Surface Treatment |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| EO | Executive Officer, APAS |
| NCR | Non-Conformance Report |
| PAFV | Polished Aggregate Friction Value |
| PCCP | Painting Contractor Certification Program |
| PDS | Product Data Sheet |
| PSV | Polished Stone Value |

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4. DEFINITIONS AND ACRONYMS (Cont.,)

4.2 Acronyms (Cont.,)

| | |
|--------------|--|
| RMU | Recognised Manufacturing Unit |
| RPM | Raised Pavement Marker |
| SCRIM | Sideways-force Coefficient Routine Investigation Machine |
| SDS | Safety Data Sheet |
| TDS | Technical Data Sheet |
| TET | Township Entry Treatment |
| VOC | Volatile Organic Compounds |
| WHS | Work Health and Safety |

5. REFERENCES

- a) The following standards are referenced in this document:
- AS 1141.11.1:** Methods for sampling and testing aggregates, Method 11.1: Particle size distribution - Sieving method
 - AS 1141.40:** Methods for sampling and testing aggregates, Method 40: Polished aggregate friction value - Vertical road-wheel machine
 - AS 1141.41:** Methods for sampling and testing aggregates, Method 41: Polished aggregate friction value - Horizontal bed machine
 - AS 1141.42:** Methods for sampling and testing aggregates, Method 42: Pendulum friction test
 - AS/NZS 1580:** Paints and related materials: Methods of test.
 - AS 2700:** Colour standards for general purpose
 - AS 2700S:** Colour standards for general purpose - swatches
 - AS 4049.4:** Paints and related materials – Pavement marking materials – Part 4: High performance pavement marking systems
 - AS 4049.5:** Paints and related materials – Pavement marking materials – Part 5 : Performance assessment of pavement markings
 - AS ISO/IEC 17025:** General requirements for the competence of testing and calibration laboratories
 - AS/NZS ISO/IEC 17065:** Conformity assessment: Requirements for bodies certifying products, processes, and services

These documents may be purchased through the Reference Standards Australia website: <https://www.standards.org.au/>

- The Therapeutic Goods (Poisons Standard - February 2024) Instrument 2024:** Part 2: Controls on Substances, Division 9 - Paint or Tinters

This document is available from the Australian Government Federal Register of Legislation website at: [Federal Register of Legislation - Therapeutic Goods \(Poisons Standard—February 2024\) Instrument 2024](#)

- Test Method TP343:** Determination of Skid Resistance with the Micro Griptester, DPTI (Department of Planning, Transport & Infrastructure), Technical Services Group Procedures

This document is available from the DPTI website: [Test Procedures and Operating Instructions - Department for Infrastructure and Transport - South Australia \(dit.sa.gov.au\)](#)

- Austrroads Test Method ATM 250 [AG:PT/T250]:** Modified Surface Texture Depth (Pestle Method)

This document is available from the Austrroads website: [ATM-250 | Austrroads](#)

- Test Method RC 421.02:** Skid Resistance of a Road Pavement using a SCRIM® Machine

This document is available from the VicRoads website: <https://www.vicroads.vic.gov.au/publications-and-forms>

- TRL Report 176:** Laboratory Test on High Friction Surfaces for Highways, Transport Research Laboratory

This document is available from the Transport Research Laboratory website: <https://trl.co.uk/uploads/trl/documents/TRL176.pdf>

- b) The following documents were utilised in the creation of this document:
- AS 4586: Slip resistance classification of new pedestrian surface materials
 - AS 4663: Slip resistance measurement of existing pedestrian surfaces
 - Australian Road Research Board (ARRB) TIPES Supplement for Applicants Coloured Surface Treatments for Department of Transport and Main Roads
 - Austrroads AGPT04K-18 Guide to Pavement Technology Part 4K: Selection and Design of Sprayed Seals, clause 3.4.6 Types of Sprayed Surface Treatments

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5. REFERENCES (Cont.,)

- v. Austroads Technical Specification ATS 3465: Coloured Surface Treatment, 2022
 - vi. Brisbane City Council, Reference Specification for Engineering Work, S155 Road Pavement Markings, Revision 5.0 March 2021
 - vii. Department of Transport and Main Roads QLD (TMR), Guideline - Coloured surface treatments for bicycle lanes, Nov 2021
 - viii. Department of Transport and Main Roads QLD (TMR), Technical Note 170, Township Entry Treatment, Jan 2022
 - ix. Department of Transport and Main Roads QLD (TMR), Technical Specification, MRTS110 Coloured Surface Treatments, March 2023
 - x. NZ Transport Agency, NZTA P33:2017 Specification for Coloured Surfacing, Apr 2017
 - xi. Transport for NSW (TfNSW), QA Specification R110 Coloured Surface Coatings for bus lanes and cycleways, Edition 2, Revision 3, June 2020
 - xii. Transport for NSW (TfNSW), Specification D & C R110, Coloured Surface Coatings for bus lanes and cycleways, June 2020 Ed 1 Rev 1
 - xiii. Victorian Department of Transport, Section 431 - Coloured Surface Treatments, April 2018
- c) The following APAS documents are referenced in this document:
- i. AP-D001 Rules Governing How APAS® Operates
 - ii. AP-D114 Rules Governing APAS® Recognition as a Testing Authority
 - iii. AP-D123 Restrictions on Ingredients in Product Formulations
 - iv. AP-D152 APAS® Participating Manufacturers and Resellers
 - v. AP-D177 Rules Governing How Product Manufacturers participate in APAS®
 - vi. AP-D181 Volatile Organic Compounds (VOC) Limits
 - vii. AP-D192 Rules Governing APAS® Product Certification Scheme
 - viii. AP-S0042 Glass Beads (and Glass Particles) – For use in and with Pavement Marking Materials

All APAS documents and specifications are available for download from the APAS website:

Documents: <https://vs.csiro.au/apas/documents/> Specifications: <https://vs.csiro.au/apas/specifications/>

6. COMPOSITION AND GENERAL REQUIREMENTS

6.1 Binder

- a) The binder types used in CSTs are typically, but not limited to, cold peroxide cured acrylate-based material (such as methyl methacrylate), thermosetting epoxy products, or urethanes.
- b) Primary importance is placed on the ability of the binder to be compliant with the technical requirements clause 8 Table 1 and clause 9 Table 2 below.

6.2 Volatiles

- a) The volatile portion shall principally be comprised of volatile, non-aqueous solvents (solvent-based products), **or** non-volatile aqueous solvents (water-based products).
- b) For VOC content restrictions, refer to APAS document AP-D181.

6.3 Pigmentation

- a) Pigments used shall be non-toxic, non-corrosive, lead-free and either organic or inorganic in nature (for coloured products), complying with the requirements of the Therapeutic Goods (Poisons Standard - February 2024) Instrument 2024.
- b) Primary importance is placed on the ability of the pigmentation to be compliant with the technical requirements of clause 8 Table 1 and clause 9 Table 2 below.

6.4 Glass Particles

- a) Glass particles used in the production of any CSTs **shall be APAS approved prior** to application of the CST for certification. For further information, refer to APAS specification AP-S0042.
- b) For any products certified prior to the inclusion of glass particles into the current version of AP-S0042, any glass particles used in the formulation of the CST shall be retrospectively certified to ensure compliance.
- c) Evidence of the approval of glass particles used in the production of the CST, such as a valid, non-expired APAS Certificate of Product Conformity, shall be provided at the time of product submission/re-submission.
- d) The requirement for certification of glass particles is in line with the revision of APAS specification AP-S0042. After consultation with industry members of RIAA and RAMPG, the inclusion of glass particles in this specification was deemed necessary to aid in the regulation of their use, specifically regarding the long-term heavy metal leaching potential.

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6. COMPOSITION AND GENERAL REQUIREMENTS (Cont..)

6.5 Glass Beads

- a) If glass beads are used in the manufacturing stage of CST, they must not be used to provide retroreflectivity characteristics and can only function as a filler or aggregate substitute. Any glass bead used in the production of any CST must be APAS approved prior to application of the CST for certification. For further information, refer to APAS specification AP-S0042.
- b) Evidence of the approval of glass beads used in the production of the CST, such as a valid, non- expired APAS Certificate of Product Conformity, must be provided at the time of product submission/re- submission.

6.6 Colour

- a) CSTs are typically available in, but not limited to, the following colours: red, green, blue, yellow, white, terracotta and black. Refer to the manufacturer's TDS or PDS for further information.

7. PRODUCT APPROVAL REQUIREMENTS

7.1 General Requirements

- a) The product and its application for approval shall comply with the relevant requirements of this specification and of APAS document AP-D192 during the life of the approval.
- b) **As not all CSTs are intended by their manufacturer for use on all surfaces, the applicable surface types that are intended for end use must all undergo the testing regime detailed in clause 8, Table 1 (also refer to NOTE 1).** For example, if a CST is intended only for application to bitumen and concrete, then samples of these must be prepared for laboratory testing and all results reported according to their material type.
- c) Upon successful assessment of the laboratory component of this specification, CLASS II (interim) certification may be awarded to undertake Stage 1 Field Testing – product applied to substrate, and three years given (from the date of certificate issue) to undertake the initial field testing.

NOTE 1: The applicable surface types that are intended for application of CSTs, as identified by the laboratory testing results, must also have field testing results supplied. For example, if intended end use is application to bitumen and concrete, then field testing results must be supplied for both types of surface types.

If Stage 1 Field Testing is successfully completed in a shorter period than the allotted three years, the RMU may seek Stage 2 (and Stage 3) field testing sooner.

- d) After successful assessment of the Stage 1 Field Testing component of this specification, CLASS I certification may be awarded. As road authority requirements extend past the standard requirements of APAS certification, there are two further stages that are required for CST products to gain extended APAS certification:
 1. **Stage 2 Field Testing:** Product applied, gained CLASS I (Stage 1 Field Testing), and has a total of five years on-road data without failure (CLASS IB).
 2. **Stage 3 Field Testing:** Product applied, gained CLASS I (Stage 1 Field Testing), CLASS IB (Stage 2 Field Testing) and has a total of seven years+ on-road data without failure (CLASS IA).

After the successful completion of each stage of field testing, the product shall be assessed accordingly for conversion from the previous level of certification to the next level of certification until full (CLASS IA) certification is attained (if required by the manufacturer).

7.2 Technical Requirements

- a) All laboratory testing shall be completed as per the requirements of clause 8, Table 1 by an ACE to be able to obtain CLASS II certification. All field testing shall be conducted in accordance with clause 9 Table 2 and Appendix A within the CLASS II certification period (Stage 1) for consideration for conversion to CLASS I certification. Stage 2 and Stage 3 field testing shall also be conducted in accordance with clause 9 Table 2 within the CLASS I and CLASS IB certification periods.
- b) All Stage 1 field testing shall be conducted in accordance with clause 9 Table 2 and Appendix B within the CLASS II certification period for consideration for conversion to CLASS I certification. Stage 2 and Stage 3 field testing shall also be conducted in accordance with clause 9 Table 2 within the CLASS I and CLASS IB certification periods.



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7. PRODUCT APPROVAL REQUIREMENTS (Cont.,)

7.2 Technical Requirements (Cont.,)

- c) Performance-based field testing of CSTs is typically undertaken on the colour(s) representing the highest volume usage (i.e., red, and green), thereby making the other colours exempt from field testing **provided that** any other colours seeking certification are based on the same formulation (specifically the binder system) as the primary applicant product(s).
- d) If a lower market volume colour is the only product seeking certification, then it shall also undertake the field testing regime detailed in clause 7.2, clause 9 Table 2 and Appendix B.

7.3 Health and Safety Requirements

- a) The product shall comply with all requirements of clause 6.3 and 6.4 of APAS document AP-D192.
- b) The manufacturer's SDS shall be studied closely prior to using the product and complied with during use of the product.
- c) Solvent-borne surface coatings are flammable and should be stored away from all sources of heat or ignition.
- d) Solvent-borne surface coating containers should be resealed immediately after use and good ventilation provided during use to minimise the risk of fire or explosion and the long-term toxic effects of absorption of the vapour into the lungs.
- e) Care should be taken to avoid contact with the skin by using protective clothing and barrier cream where necessary.
- f) Products intended for sale in Australia shall comply with all the requirements of the Therapeutic Goods (Poisons Standard - February 2024) Instrument 2024. Products intended for sale in other countries shall comply with all local WHS and environmental requirements.

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8. LABORATORY PERFORMANCE PROPERTIES

Table 1: Laboratory Performance Properties¹

| TEST: | APPLICABLE STANDARD / TEST REFERENCE: | REQUIREMENTS: | | | | | | | | | | | | | | | | |
|---|---|--|---------|-----------------------|-----|--|-------|---|--------|---|------|--------------------------------------|------------|---|-------|------------|-------|----------------------------|
| Application Properties | AS/NZS 1580.205.1 (Brush) AS/NZS 1580.205.3 (Roller) AS/NZS 1580.205.2 (Spray) AS/NZS 1580.205.4 (Spray) | Uniform film, with even edges. If applied by spray or machine application, there should be no objectionable splatter and the gun does not clog under normal requirements. NOTE: As there are no Australian Standards for screed and squeegee application, the application thickness of the CST in relation to these tests must be in line with the Manufacturers guidelines and recommendations (or an adaption thereof) as per the TDS &/or PDS. All test parameters i.e., application thickness, equipment used etc., must be reported at the same time as results. Report method of application and all results. | | | | | | | | | | | | | | | | |
| No-Pick-Up Time | AS/NZS 1580.401.8 | < 45 minutes. Report all results. NOTE: This test is performed on the binder system (no aggregate). | | | | | | | | | | | | | | | | |
| Colour | AS 4049.4 (clause 6.2.2 & Appendix F) AS/NZS 1580.601.1 AS 2700 | <table border="1"> <thead> <tr> <th>Colour:</th> <th>Approximate match to:</th> </tr> </thead> <tbody> <tr> <td>Red</td> <td>R13 Signal Red, or alternatives: R14 Waratah, R15 Crimson, R53 Redgum, R54 Raspberry, or R62 Venetian Red.</td> </tr> <tr> <td>Green</td> <td>G13 Emerald Green, or alternatives: G16 Traffic Green, G23 Shamrock, or G27 Homebush green (G26 Apple Green and G36 Kikuyu are also used in New Zealand).</td> </tr> <tr> <td>Yellow</td> <td>Y11 Canary, or alternatives: Y12 Wattle, Y13 Vivid Yellow, Y14 Golden Yellow, or Y42 Mustard.</td> </tr> <tr> <td>Blue</td> <td>B24 Harbour Blue or B21 Ultramarine.</td> </tr> <tr> <td>Terracotta</td> <td>R42 Salmon Pink, or alternatives: R43 Red Dust or R52 Terracotta.</td> </tr> <tr> <td>White</td> <td>N14 White.</td> </tr> <tr> <td>Black</td> <td>B64 Charcoal or N61 Black.</td> </tr> </tbody> </table> <p>NOTE:</p> <ul style="list-style-type: none"> - Alternative colours (i.e., grey) may also be evaluated as per the requirements of road authorities. - Colours must be compared to, and equivalent to, a known AS 2700 colour. State colour designation and results. <p>Report all results.</p> | Colour: | Approximate match to: | Red | R13 Signal Red, or alternatives: R14 Waratah, R15 Crimson, R53 Redgum, R54 Raspberry, or R62 Venetian Red. | Green | G13 Emerald Green, or alternatives: G16 Traffic Green, G23 Shamrock, or G27 Homebush green (G26 Apple Green and G36 Kikuyu are also used in New Zealand). | Yellow | Y11 Canary, or alternatives: Y12 Wattle, Y13 Vivid Yellow, Y14 Golden Yellow, or Y42 Mustard. | Blue | B24 Harbour Blue or B21 Ultramarine. | Terracotta | R42 Salmon Pink, or alternatives: R43 Red Dust or R52 Terracotta. | White | N14 White. | Black | B64 Charcoal or N61 Black. |
| Colour: | Approximate match to: | | | | | | | | | | | | | | | | | |
| Red | R13 Signal Red, or alternatives: R14 Waratah, R15 Crimson, R53 Redgum, R54 Raspberry, or R62 Venetian Red. | | | | | | | | | | | | | | | | | |
| Green | G13 Emerald Green, or alternatives: G16 Traffic Green, G23 Shamrock, or G27 Homebush green (G26 Apple Green and G36 Kikuyu are also used in New Zealand). | | | | | | | | | | | | | | | | | |
| Yellow | Y11 Canary, or alternatives: Y12 Wattle, Y13 Vivid Yellow, Y14 Golden Yellow, or Y42 Mustard. | | | | | | | | | | | | | | | | | |
| Blue | B24 Harbour Blue or B21 Ultramarine. | | | | | | | | | | | | | | | | | |
| Terracotta | R42 Salmon Pink, or alternatives: R43 Red Dust or R52 Terracotta. | | | | | | | | | | | | | | | | | |
| White | N14 White. | | | | | | | | | | | | | | | | | |
| Black | B64 Charcoal or N61 Black. | | | | | | | | | | | | | | | | | |
| Abrasion Resistance | AS/NZS 1580.403.2 | Test run using CS17 abrasion wheels, 1000g applied weight. ≤ 50mg weight loss after 500 cycles. Report all results. | | | | | | | | | | | | | | | | |
| Polished Aggregate Friction Value (PAFV) | AS 1141.40 or AS 1141.41 and 1141.42 | Friction Value ≥ 55. State all results and method of sample preparation i.e., AS 1141.40 or AS 1141.41. If unable to test due to aggregate size, state on report. NOTE: Applicable ONLY to aggregate sizes greater than 6.7 mm and less than 9.5 mm in width and greater than 30 mm or 40 mm in length (depending on the type of road-wheel machine). | | | | | | | | | | | | | | | | |
| Aggregate Size | AS 1141.11.1 | Minimum 95% passing 3.35 mm sieve and maximum 5% passing 1.18 mm sieve. NOTE: Alternative aggregate sizing may be considered on a case-by-case basis by the APAS EO depending on the CSTs intended end use/application site. | | | | | | | | | | | | | | | | |

PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

8. LABORATORY PERFORMANCE PROPERTIES (Cont.,)

Table 1: Laboratory Performance Properties¹ (Cont.,)

| TEST: | APPLICABLE STANDARD / TEST REFERENCE: | REQUIREMENTS: | | | | | | | | | | | | | | | | | | |
|---|---|---|---|-------------------------------------|---|--|---|------------------------------------|--------|---------------|------|--------------|------------|--------------|-------|--------|-------|-------|---------------|--------------|
| Luminance Factor | AS 4049.4 (clause 6.2.1, Appendix F and Appendix H) | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Colour:</th> <th style="width: 50%;">Luminance:</th> </tr> </thead> <tbody> <tr> <td>Red</td> <td>≥ 5 – ≤ 15 %</td> </tr> <tr> <td>Green</td> <td>≥ 5 – ≤ 15 %</td> </tr> <tr> <td>Yellow</td> <td>≥ 45 – ≤ 50 %</td> </tr> <tr> <td>Blue</td> <td>≥ 5 – ≤ 15 %</td> </tr> <tr> <td>Terracotta</td> <td>≥ 5 – ≤ 15 %</td> </tr> <tr> <td>White</td> <td>≥ 80 %</td> </tr> <tr> <td>Black</td> <td>≤ 5 %</td> </tr> <tr> <td>Other Colours</td> <td>≥ 5 – ≤ 15 %</td> </tr> </tbody> </table> <p>Report all results.</p> <p>NOTE: Exceptions to the above luminance range values will be assessed on a case-by-case basis depending on end user requirements within the AS 2700 colour range.</p> | Colour: | Luminance: | Red | ≥ 5 – ≤ 15 % | Green | ≥ 5 – ≤ 15 % | Yellow | ≥ 45 – ≤ 50 % | Blue | ≥ 5 – ≤ 15 % | Terracotta | ≥ 5 – ≤ 15 % | White | ≥ 80 % | Black | ≤ 5 % | Other Colours | ≥ 5 – ≤ 15 % |
| Colour: | Luminance: | | | | | | | | | | | | | | | | | | | |
| Red | ≥ 5 – ≤ 15 % | | | | | | | | | | | | | | | | | | | |
| Green | ≥ 5 – ≤ 15 % | | | | | | | | | | | | | | | | | | | |
| Yellow | ≥ 45 – ≤ 50 % | | | | | | | | | | | | | | | | | | | |
| Blue | ≥ 5 – ≤ 15 % | | | | | | | | | | | | | | | | | | | |
| Terracotta | ≥ 5 – ≤ 15 % | | | | | | | | | | | | | | | | | | | |
| White | ≥ 80 % | | | | | | | | | | | | | | | | | | | |
| Black | ≤ 5 % | | | | | | | | | | | | | | | | | | | |
| Other Colours | ≥ 5 – ≤ 15 % | | | | | | | | | | | | | | | | | | | |
| Volatile Organic Content (VOC) | APAS AP-D181 | <p>For MMA based products: < 5 g/L.</p> <p>Water-based: ≤ 60 g/L</p> <p>Alternative binder systems: Report in g/L.</p> <p>Report all results.</p> | | | | | | | | | | | | | | | | | | |
| Odour | Appendix A, AP-S0041/7 | After 4 hours, the ratio of Control CAP to Test CST average rating shall not be less than 2. | | | | | | | | | | | | | | | | | | |
| Scuffing³ | TRL176 ² , Appendix G | <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 70%;">Initial Measurement: High Texture Depth Moderate Texture Depth Low Texture Depth</td> <td style="width: 30%; text-align: right;">≥ 1.4 mm ≥ 1.0 mm N/A</td> </tr> <tr> <td>After 500-wheel passes: High Texture Depth Moderate Texture Depth Low Texture Depth Erosion Index</td> <td style="text-align: right;">≥ 1.0 mm ≥ 0.6 mm N/A ≤ 3</td> </tr> <tr> <td>After heat ageing for 112 days at 70°C ± 3°C and 500-wheel passes: High Texture Depth Moderate Texture Depth Low Texture Depth Erosion Index</td> <td style="text-align: right;">≥ 1.0 mm ≥ 0.6 mm N/A ≤ 5</td> </tr> </tbody> </table> | Initial Measurement: High Texture Depth Moderate Texture Depth Low Texture Depth | ≥ 1.4 mm ≥ 1.0 mm N/A | After 500-wheel passes: High Texture Depth Moderate Texture Depth Low Texture Depth Erosion Index | ≥ 1.0 mm ≥ 0.6 mm N/A ≤ 3 | After heat ageing for 112 days at 70°C ± 3°C and 500-wheel passes: High Texture Depth Moderate Texture Depth Low Texture Depth Erosion Index | ≥ 1.0 mm ≥ 0.6 mm N/A ≤ 5 | | | | | | | | | | | | |
| Initial Measurement: High Texture Depth Moderate Texture Depth Low Texture Depth | ≥ 1.4 mm ≥ 1.0 mm N/A | | | | | | | | | | | | | | | | | | | |
| After 500-wheel passes: High Texture Depth Moderate Texture Depth Low Texture Depth Erosion Index | ≥ 1.0 mm ≥ 0.6 mm N/A ≤ 3 | | | | | | | | | | | | | | | | | | | |
| After heat ageing for 112 days at 70°C ± 3°C and 500-wheel passes: High Texture Depth Moderate Texture Depth Low Texture Depth Erosion Index | ≥ 1.0 mm ≥ 0.6 mm N/A ≤ 5 | | | | | | | | | | | | | | | | | | | |
| Wear³ | TRL 176 ² , Appendix H | <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 70%;">Initial Measurement: High Texture Depth Moderate Texture Depth Low Texture Depth BPN</td> <td style="width: 30%; text-align: right;">≥ 1.4 mm ≥ 1.0 mm N/A ≥ 55</td> </tr> <tr> <td>After 100,000-wheel passes: High Texture Depth Moderate Texture Depth Low Texture Depth Erosion Index BPN</td> <td style="text-align: right;">≥ 1.0 mm ≥ 0.6 mm N/A ≤ 3 ≥ 55</td> </tr> </tbody> </table> | Initial Measurement: High Texture Depth Moderate Texture Depth Low Texture Depth BPN | ≥ 1.4 mm ≥ 1.0 mm N/A ≥ 55 | After 100,000-wheel passes: High Texture Depth Moderate Texture Depth Low Texture Depth Erosion Index BPN | ≥ 1.0 mm ≥ 0.6 mm N/A ≤ 3 ≥ 55 | | | | | | | | | | | | | | |
| Initial Measurement: High Texture Depth Moderate Texture Depth Low Texture Depth BPN | ≥ 1.4 mm ≥ 1.0 mm N/A ≥ 55 | | | | | | | | | | | | | | | | | | | |
| After 100,000-wheel passes: High Texture Depth Moderate Texture Depth Low Texture Depth Erosion Index BPN | ≥ 1.0 mm ≥ 0.6 mm N/A ≤ 3 ≥ 55 | | | | | | | | | | | | | | | | | | | |

PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

8. LABORATORY PERFORMANCE PROPERTIES (Cont.)

Table 1: Laboratory Performance Properties¹ (Cont.)

| TEST: | APPLICABLE STANDARD / TEST REFERENCE: | REQUIREMENTS: | | | | |
|---|---------------------------------------|---|-------------------------------|-----------------------|-------------------------------|-----------------------|
| Tensile Adhesion | TRL 176 ² , Appendix J | <table border="1"> <tr> <td>Stress at -10°C ± 2°C:</td> <td>1.0 N/mm²</td> </tr> <tr> <td>Stress at +20°C ± 2°C:</td> <td>0.5 N/mm²</td> </tr> </table> <p>Report all results.</p> | Stress at -10°C ± 2°C: | 1.0 N/mm ² | Stress at +20°C ± 2°C: | 0.5 N/mm ² |
| Stress at -10°C ± 2°C: | 1.0 N/mm ² | | | | | |
| Stress at +20°C ± 2°C: | 0.5 N/mm ² | | | | | |
| Chemical Resistance – Susceptibility to Hydrocarbon Fuels & Oils | TRL 176 ² , Appendix M & G | <p>Record and report:</p> <ul style="list-style-type: none"> Initial texture depth Final texture depth, erosion index and visual observations of the specimen after conditioning in the fuel/oil and Scuff testing performed Loss of texture depth post-testing <p>This test shall be conducted on each of the following fuel and oil types:</p> <ul style="list-style-type: none"> Standard unleaded fuel Unleaded fuel + 10% ethanol Diesel fuel Conventional engine oil Synthetic engine oil | | | | |

¹ Requires representative samples of finished product CST applied to a suitable substrate i.e., bitumen &/or concrete (depending on intended end use), prepared as per Appendix A, B & C of TRL 176, approximately 300mm x 300mm x 50mm in size (prior to addition of CST), and produced &/or supplied for testing by an ACE or CRCL within a week of production.

The samples produced must be from a recently produced batch of CST representative of the current primary formulation and all testing performed on these samples.

No specified number of samples have been indicated as it is up to the manufacturer &/or testing agency to determine how many samples are required for the tests to be undertaken; this could involve a sample being used for multiple tests if the sample can adequately show results for all tests undertaken.

² If the RMU does not have the capability or the facilities to run these tests, the ARRB/NRTO (Australian Road Research Board/National Transport Research Organisation, a CRCL facility) does have these facilities and capability. The ARRB/NRTO can be contacted at via their websites www.arrb.com.au or www.nrto.org.au

³ Texture Depth ratings i.e., High, Moderate and Low, are based on end-use speed categories:

- High Texture Depth: >80 km/h
- Moderate Texture Depth: 60-80 km/h
- Low Texture Depth: <60 km/h

If a product is intended for use at one or more texture depths, then they shall be tested in accordance with each of these Texture Depth requirements.

PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

9. FIELD TESTING PERFORMANCE PROPERTIES

Table 2: Field Testing Performance Properties

NOTE: Refer to Appendix B for Field Testing Requirements.

| TEST: | APPLICABLE STANDARD / TEST REFERENCE ⁵ : | REQUIREMENTS: |
|--|--|---|
| Skid Resistance⁴ | AS 4049.4 (clause 6.3.5 and Appendix J) &/or TP343 &/or RC421.02 | <p>One (or more) of the following methods of Skid Resistance determination is required. Regardless of the method, sufficient testing must be performed to obtain objective data with all results (and their average) reported.</p> <p>Measurements are to be taken from the trafficked wheel path in the direction of travel. The lane designation must be reported for each location evaluated (inner, outer or between the wheel paths).</p> <p>Wet Pendulum Method (using Slider 55 in test method): No individual measurement result shall be < 50 BPN and the overall average BPN shall be ≥ 55.</p> <p>Micro Grip Tester Method: No individual measurement result shall be < 0.50 Grip Number and the overall average Grip shall be ≥ 0.55.</p> <p>SCRIM Method: No individual measurement result shall be < 0.50 SFC and the overall average shall be ≥ 0.55 SFC.</p> |
| Surface Texture Depth⁴ | ATM 250 | <p>This test shall be performed at 10 separate locations of the in-situ product placement; all measurements, and the overall average measurement shall be reported; no individual measurement result shall be < 1.0 mm (High Texture Depth), < 0.6 mm (Moderate Texture Depth) and is N/A for Low Texture Depth.</p> <p>NOTE: Alternative Surface Texture Depths (i.e., >1.0 mm) will be considered on a case-by-case basis dependent on the specific field testing site and site speed limit (i.e., >100 km/h).</p> |
| Colour | AS/NZS 1580.601.1 & AS 2700S (Swatch specific to colour under test) | <p>Assessed by visual inspection in daylight conditions of the in-situ product placement; surface must be clean and free from debris.</p> <p>Rating ≥ 3 (approximate match) when compared to the specific AS 2700 colour stipulated. Report all results.</p> <p>NOTE: This test is a variation to AS/NZS 1580.601.1 performed in situ under clear, visible daylight.</p> |
| Degree of Wear | AS 4049.4 (clause 6.3.4 and Appendix L) | ≥ 95% remaining intact in the wheel path. Report all results. |
| Delamination | Visual Inspection | <p>Assessed by visual inspection of the entire CST location. ≤ 1% in any sq m and ≤0.1% of total area of work.</p> <p>Report all results.</p> |
| Stripping | Visual Inspection | <p>Assessed by visual inspection of the entire CST location. ≤ 1% in any sq m and ≤0.1% of total area of work.</p> <p>Report all results.</p> |
| Raveling | Visual Inspection | <p>Assessed by visual inspection of the entire CST location. ≤ 1% in any sq m and ≤0.1% of total area of work.</p> <p>Report all results.</p> |



PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

9. FIELD TESTING PERFORMANCE PROPERTIES (Cont.)

Table 2: Field Testing Performance Properties (Cont.)

NOTE: Refer to Appendix B for Field Testing Requirements.

| TEST: | APPLICABLE STANDARD / TEST REFERENCE ⁵ : | REQUIREMENTS: |
|--------------|---|--|
| Odour | Olfactory Inspection on site | On a scale of 0 – 5 with 0 being not offensive and 5 being offensive rate the odour for the following characteristics: <ul style="list-style-type: none">- Degree of offensiveness of odour- Level of odour present (i.e., weak smell, strong smell) NOTE: This a subjective test and will require the results from a minimum of 2 individual person assessments with all results reported. |

⁴ Surface Texture Depth testing shall be performed at the same testing location as the Skid Resistance testing.

⁵ Alternative test references/specifications **may** be considered on a case-by-case basis by the APAS EO; the manufacturer is required to indicate how the test method used correlates to the specified test method(s) in Table 2 and how the test results comply with the stated requirements.



PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

APPENDIX A

Odour Comparison

A1. Scope:

This procedure provides a method for the subjective comparison of odour produced by a CST during its drying phase. It is intended to simulate the odour present at the time of CST application on site.

A2. Equipment:

- i. Two 50 L sealable containers (i.e., plastic storage box) with appropriate lids. Each lid shall have a hole 40 – 50 mm diameter located centrally. A removable plug shall seal each test unit except during odour assessment - a domestic bathroom plug is suitable.
- ii. Two representative samples **each** of the intended end use substrate (i.e., bitumen, concrete etc.), prepared in accordance with Appendix A, B & C of TRL 176, approximately 300mm x 300mm x 50mm in size (prior to addition of CST).
- iii. Test CST and Control Cold Applied Plastic (CAP). The control shall be a standard CAP from the manufacturer's range of the same binder system and application mode, approved to APAS specification AP-S0041/3.

NOTE: If the manufacturer does not have an approved CAP product, contact APAS for further information.

- iv. Three laboratory staff members to perform the testing.

A3. Procedure:

- i. Apply CST with the recommended application mode and film thickness to one substrate sample as quickly as practicable. Place the sample inside one 50 L container and also place the lid with the plug-in position on the 50 L container.
- ii. Repeat with the other 50 L container and substrate sample using the Control CAP with its recommended application mode and spreading rate.

NOTE: If testing more than one substrate type, additional 50L storage containers and substrate samples must be obtained and prepared in accordance with steps A3 i.

- iii. Allow all containers to remain undisturbed in routine laboratory conditions according to AS/NZS1580.101.4 for a period of 4 hours.

NOTE: The lighting requirements of AS/NZS 1580.101.4 do not apply.

- iv. Remove the plug from the lid of the Control CAP and through the hole in the lid smell the contents briefly. Replace the plug. Rate the odour according to A3 vii. below.

- v. Immediately repeat the odour assessment using the Test CST and rate its odour according to A3 vii. below.

NOTE: If testing more than one substrate/CST combination, repeat steps A3 iv. and A3 v. for all additional substrate types.

- vi. Repeat A3 iv. and A3 v. for Control and Test CST samples using two other laboratory staff members.

- vii. On a scale of 0 – 5 with 0 being low (not offensive) and 5 being high (offensive), rate the odour for the following characteristics:

- a. Degree of offensiveness of odour
- b. Level of odour present (i.e., weak smell, strong smell)

- viii. Each laboratory staff member will provide four numerical results (2 test and 2 control); this number of results will vary depending on the number of substrate/CST combinations tested.

- ix. Add all the ratings for the Test CST for all laboratory staff members and calculate the average total score for the Test CST(s). Repeat for the Control CAP.

- x. Calculate the ratio of Control average to Test average.



PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

APPENDIX B

Field Testing Requirements

OPTION 1, STAGE 1: Field testing performed on a new job

The following requirements shall be met:

1. Full NCR Review:

The full history of the product in relation to all non-conformance reports generated by the Client through their quality reporting system i.e., CAIR, (e.g., product complaints, issues with manufacture etc.) is required to be supplied to APAS (Commercial-in-confidence) from both the lab (QC) and in service NCRs.

2. Testing of product sample:

A representative 5-litre sample of the product being applied for the purposes of the job (and subsequently field-testing) shall be obtained by the Client (product manufacturer) in conjunction with the PCCP Contractor and supplied to APAS for independent testing to the laboratory requirements of this specification.

NOTE: The 5-litre test sample is additional to the 1-litre retain sample that is retained, as normal, by the product manufacturer at the time of manufacture.

3. Field Testing performed on a new job:

- A PCCP contractor, with current and valid certification, in conjunction with the product manufacturer that is seeking product certification, shall apply the CST as per the specific requirements of the tender/job in line with the manufacturer recommendations for application. Full details of the job shall be supplied to APAS including all information pertaining to the application by the PCCP contractor i.e., product batch numbers applied, humidity & temperature readings, measurements taken, site preparation details, equipment used, calibration records etc.
The PCCP Contractor shall perform all testing required in the wheel path(s), in line with the field testing performance properties of clause 9 Table 2, post-application/cure (Initial Measurement Point).
The PCCP Contractor shall return to the site at the Interim Measurement Point (see table below) to perform all the testing required in the wheel path(s) in line with the field testing performance properties of clause 9 Table 2.
The PCCP Contractor shall return to the site at the Final Measurement Point (see table below) to perform all the testing required in the wheel path(s), in line with the field testing performance properties of clause 9 Table 2.

NOTE: A CSIRO Verification Service Officer shall be present at the time of all testing and data collection and witness the testing. All costs associated with the presence of the CSIRO Verification Services officer will be the responsibility of the Client.

Table with 4 columns: Substrate Type, Initial Measurement Point, Interim Measurement Point, Final Measurement Point. Row 1: Asphalt (or other substrate type), After application / cure, 2,000,000 Vehicle Passes, 4,000,000 Vehicle Passes

- A minimum of 5 testing locations^ over the length of a job site shall be assessed*, and the GPS positioning of each of the 5 test sites recorded. The 5 testing sites shall be spread out over the entire course of the job i.e., if site of application is 25 km, a test site every 5 km (or as near to) would suffice. Each of the 5 testing locations shall have a minimum of three measurements taken for each of the tests.
Length of job site and the substrate the product has been applied to shall be indicated on the final report supplied to APAS.
A test plan shall be supplied by the RMU to APAS prior to the undertaking of the work to determine the site suitability. A copy of all relevant site application paperwork completed by the PCCP contractor will also be supplied at the end of the application at the time of or directly after the Initial Measurement Point testing.
A final report encompassing all initial, interim, and final measurement point testing shall be supplied to APAS for determination of suitability for conversion of certification from CLASS II to CLASS I.

NOTE:

* Delamination, Stripping and Raveling are assessed for the entire job site, not testing location specific.

^ Surface Texture Depth requires 10 locations (refer to clause 9 Table 2).

- All costs associated with the performance of field testing, including retain sample analysis and CSIRO Verification Services Officer presence on site, shall be the responsibility of the Client.



PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

APPENDIX B (Cont.,)

Field Testing Requirements (Cont.,)

OPTION 2, STAGE 1: Field testing performed on an existing job

Where field testing is unable to be performed according to OPTION 1, STAGE 1, a variation to field test (OPTION 2, STAGE 1, as follows) will be considered on the analysis of an existing job whereby all the following requirements are met:

1. Full NCR Review:

The full history of the product in relation to all non-conformance reports generated by the Client through their quality reporting system i.e., CAIR, (e.g., product complaints, issues with manufacture etc.) is required to be supplied to APAS (Commercial-in-confidence) from both the lab (QC) and in service NCRs.

2. Testing of retained material sample:

The product that has been applied to the field testing site is required to be ≤ 2 years old so that the Client (product manufacturer) can supply the 1-litre batch retain sample to APAS for independent testing to the laboratory requirements of this specification.

3. On-site testing of product on already existing jobs

- In-service, on-the-road product that has been applied by a PCCP contractor (with current and valid certification) will be considered as long as:
- The product applied is ≤ 2 years old so that the Client can supply the APAS batch retain sample to APAS for independent testing.
- The application site has all available information pertaining to the original application by the PCCP contractor i.e., product batch numbers applied, humidity & temperature readings, measurements taken, site preparation details, equipment used, calibration records etc. This information shall be supplied as part of the Test Plan prepared by the Client in conjunction with the PCCP contractor, and
- The Site has achieved the required level of vehicle passes (see below).

Table with 2 columns: Substrate Type, Minimum Measurement Point. Row 1: Asphalt (or other substrate type), 4,000,000 Vehicle Passes

- Field testing performance properties, in line with clause 9 Table 2, are to be evaluated by the original PCCP contractor if they have the specific equipment, and are suitably qualified, to undertake the assessment accordingly with all measurements taken in the wheel path(s). If the original PCCP contractor is unsuitable or unavailable for testing assessment, alternative PCCP contractors shall be considered.

NOTE: A CSIRO Verification Service Officer shall be present at the time of testing and data collection and witness the testing. All costs associated with the presence of the CSIRO Verification Services officer shall be the responsibility of the Client.

- A minimum of 5 testing locations^ over the length of a job site shall be assessed*, and the GPS positioning of each of the 5 test sites recorded. The 5 testing sites shall be spread out over the entire course of the job i.e., if site of application is 25 km, a test site every 5 km (or as near to) would suffice. Each of the 5 testing locations shall have a minimum of three measurements taken for each of the tests.
- Length of job site and the substrate the product has been applied to shall also be indicated on the final report supplied to APAS.
- A test plan, including all relevant original site application paperwork supplied by the PCCP contractor, shall be supplied by the RMU to APAS prior to the undertaking of the work to determine the site suitability.
- A final report shall be supplied to APAS for determination of suitability for conversion of certification from CLASS II to CLASS I.

NOTE:

* Delamination, Stripping and Raveling are assessed for the entire job site, not testing location specific.

^ Surface Texture Depth requires 10 locations (refer to clause 9 Table 2).

- All costs associated with the performance of field testing, including retain sample analysis and CSIRO Verification Services Officer presence on site, shall be the responsibility of the Client.



PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

APPENDIX B (Cont.)

Field Testing Requirements (Cont.)

STAGE 2: Field testing

After the product has attained CLASS I (Stage 1 field testing) and has a total of five years on-road data without failure, the following requirements shall be met to be considered for CLASS IB certification:

- In-service, on-the-road product that had been applied by a PCCP contractor (with current and valid certification) and already undergone Stage 1 field testing with the report supplied previously to APAS.
- The same PCCP contractor returns to the site of the Stage 1 field testing and performs all testing in accordance with clause 9 Table 2 with all measurements taken in the wheel path(s). If the original PCCP contractor is unsuitable or unavailable for testing assessment, an alternative PCCP contractors shall be considered.

NOTE: A CSIRO Verification Service Officer shall be present at the time of testing and data collection and witness the testing. All costs associated with the presence of the CSIRO Verification Services officer shall be the responsibility of the Client.

- A minimum of 5 testing locations[^] over the length of a job site shall be assessed*, and the GPS positioning of each of the 5 test sites recorded. The 5 testing sites shall be spread out over the entire course of the job i.e., if site of application is 25 km, a test site every 5 km (or as near to) would suffice. Each of the 5 testing locations shall have a minimum of three measurements taken for each of the tests.
- Length of job site and the substrate the product has been applied to shall also be indicated on the final report supplied to APAS.
- A test plan, including all relevant original site application paperwork supplied by the PCCP contractor, shall be supplied by the RMU to APAS **prior** to the undertaking of the work to determine the site suitability.
- A final report shall be supplied to APAS for determination of suitability for conversion of certification from CLASS I to CLASS IB.

NOTE:

* Delamination, Stripping and Raveling are assessed for the entire job site, not testing location specific.

[^] Surface Texture Depth requires 10 locations (refer to clause 9 Table 2).

- All costs associated with the performance of field testing, including retain sample analysis and CSIRO Verification Services Officer presence on site, shall be the responsibility of the Client.



PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

APPENDIX B (Cont.,)

Field Testing Requirements (Cont.,)

STAGE 3: Field testing

After the product has attained CLASS IB (Stage 2 field testing) and has a total of seven years+ on-road data without failure, following requirements shall be met to be considered for CLASS IA certification:

- In-service, on-the-road product that had been applied by a PCCP contractor (with current and valid certification), already undergone Stage 1 and Stage 2 field testing with the two reports supplied previously to APAS.
- The same PCCP contractor returns to the site of the Stage 1 & 2 field testing and performs all testing in accordance with clause 9 Table 2 with all measurements taken in the wheel path(s). If the original PCCP contractor is unsuitable or unavailable for testing assessment, an alternative PCCP contractors shall be considered.

NOTE: A CSIRO Verification Service Officer shall be present at the time of testing and data collection and witness the testing. All costs associated with the presence of the CSIRO Verification Services officer shall be the responsibility of the Client.

- A minimum of 5 testing locations[^] over the length of a job site shall be assessed*, and the GPS positioning of each of the 5 test sites recorded. The 5 testing sites shall be spread out over the entire course of the job i.e., if site of application is 25 km, a test site every 5 km (or as near to) would suffice. Each of the 5 testing locations shall have a minimum of three measurements taken for each of the tests.
- Length of job site and the substrate the product has been applied to shall also be indicated on the final report supplied to APAS.
- A test plan, including all relevant original site application paperwork supplied by the PCCP contractor, shall be supplied by the RMU to APAS **prior** to the undertaking of the work to determine the site suitability.
- A final report shall be supplied to APAS for determination of suitability for conversion of certification from CLASS IB to CLASS IA.

NOTE:

*Delamination, Stripping and Raveling are assessed for the entire job site, not testing location specific.

[^]Surface Texture Depth requires 10 locations (refer to clause 9 Table 2).

- All costs associated with the performance of field testing, including retain sample analysis and CSIRO Verification Services Officer presence on site, shall be the responsibility of the Client.



PAVEMENT MARKING MATERIAL – COLOURED SURFACE TREATMENT

APPENDIX C

Document History

Status: Current
Version: 2
Date Published: 06-01-2025

| Document Version No.: | Date Published: | Summary of Changes: |
|-----------------------|-----------------|---|
| 2 | 06-01-2025 | <ul style="list-style-type: none">Removed clause 7.2 b) regarding future requirements. |
| 1 | 17-12-2024 | <ul style="list-style-type: none">Full Technical Review.Updated the values for High Texture Depth and Moderate Texture Depth in the Scuffing and Wear tests.Updated Note in the Polished Aggregate Friction Value (PFAV) test.Updated VOC requirements.Updated clause 3.1 f) to include water-based materials.Updated clause 6.5 a), 6.6 a) and 7.1 b) |
| 0 | 25-03-2023 | <ul style="list-style-type: none">Original document introduction |