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| AUSTROADS TECHNICAL SPECIFICATION ATS 3465  Coloured Surface Treatment | A close up of a flag  Description automatically generated |
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# Scope

Austroads Technical Specification ATS 3465 sets out the requirements for the supply and application of Coloured Surface Treatment (CST).

ATS 3465 does not:

1. apply to treatments where reflectivity is the primary acceptance criterion;
2. apply to longitudinal pavement marking (refer ATS 4110); and
3. cover the process to select the type of surface treatment.

CST is applied to the road pavement surface in applications such as:

1. cycleways/bike lanes;
2. bus lanes;
3. threshold treatments for school zones;
4. threshold treatments for wildlife conservation areas; and
5. township entry treatments.

# Referenced Documents

The following documents are referenced in this Specification:

|  |
| --- |
| **Australian/New Zealand Standards**  AS 1141.40 Methods for sampling and testing aggregates Polished aggregate friction value - Vertical road-wheel machine  AS 1141.41 Methods for sampling and testing aggregates Polished aggregate friction value - Horizontal bed machine  AS 1141.42 Methods for sampling and testing aggregates Pendulum friction test  AS/NZS 1580.601.1 Paints and related materials - Methods of test, Method 601.1: Colour - Visual comparison  AS 2700S Colour Standards for General Purposes - Swatches  AS 4663 Slip resistance measurement of existing pedestrian surfaces  AS ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories |
| **Austroads**  AP-C87 Austroads Glossary of Terms  ATM 250 Modified Surface Texture Depth (Pestle Method)  ATM 055 Polished Stone Value  ATM 020 Random Selection of Sampling or Test Locations  ATS 3050 Supply of Recycled Crushed Glass Sand  ATS 4110 Longitudinal Pavement Marking |

# Definitions

In addition to the definitions in AP-C87, the following definitions apply to this Specification.

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| **Binder:** | Resin used to bond the aggregate to the existing road surface |
| **Defect: (1)** | Includes loss of aggregate, bleeding, fatty areas, flushing, loss of skid resistance, delamination and a non-conformance with the requirements of Clause 9. |
| **Defect Liability**  **Period: (1)** | The period for which the Contractor is responsible for repair of Defects in the CST. |
| **Minimum Pavement Curing Period:** | The minimum period that must elapse between the completion of the pavement surface and the application of the CST. |
| **Priming Material:** | A substance used to clean and prepare the existing road prior to the application of binder. Priming materials may be used to improve the adhesion of the binder to the existing road surface. |
| **Principal’s Registration Scheme:** | A scheme for the prequalification, registration or approval of products, quarries, manufacturers and/or suppliers in operation in the jurisdiction where the CST is to be placed. |
| **Protective Sealer:** | A substance used to protect and seal the CST from fuel and oil spills. |

Notes:

1. These definitions apply for the purpose of this Specification only, notwithstanding any other definition in the Contract documents.

# Quality System Requirements

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

Table 4.1: Quality Plan

| Clause | Description of document |
| --- | --- |
| 5.4 | Design details |
| 6.1 | Details of constituent materials |
| 6.5 | Evidence of satisfactory product performance (if a Principal’s Registration Scheme does not apply) |
| 7.1 | Procedures and/or the manufacturer's instructions for surface preparation, application and clean-up. |
| 10.1 | Details of the proposed treatment to repair a Defect |

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| **HOLD POINT 1** | |
| Process Held | Commencement of the application of CST. |
| Submission Details | The Quality Plan must be provided to the Principal at least 10 working days prior to the commencement of work on site. |

# Design and Performance Requirements

## General

The Contractor must design and apply a CST which meets the performance requirements of this Specification until the expiry of the Defects Liability Period.

The Contractor is responsible for:

1. the design of the CST, including selection of the materials;
2. inspection of each site and making any adjustment necessary to the design to account for the condition of the substrate;
3. road surface preparation, supply and application of the CST and clean up; and
4. repair of any Defects until the expiry of the Defect Liability Period.

Unless specified otherwise, CST must not be applied to open grade asphalt.

The Quality Plan must include details of the CST design, including:

1. the determination of the binder application rates as a function of aggregate size and substrate texture depth;
2. the methodology for the inspection of each site and making any adjustment necessary to the design to account for the design traffic loading, the condition and texture of the substrate; and
3. if the system uses low viscosity binders (i.e. <3 Pa.s) the explicit coating rate of the top-coat binder.

The design must take the following into consideration:

1. the condition and stability of the underlying materials;
2. the local environment including, rainfall, temperature, humidity, dew-point, wind profiles, and the presence of water conditions;
3. existing surface texture and porosity;
4. geometry including cross fall and grade;
5. drainage including surface drainage; and
6. the construction methodology and traffic management.

In addition to meeting the requirements of Clause 9, the CST must be:

1. able to withstand the action of traffic (e.g. acceleration, braking, turning and scrubbing forces) without damage;
2. resistant to fuel and oil spills;
3. resistant to fading;
4. non-flammable after placement and curing;
5. free from offensive odours after placement and curing;
6. able to be swept using a mechanical broom and cleaned with high pressure water without damage;
7. free from any environmental contaminants such as lead and other heavy metals; and
8. chemically stable when subjected to prolonged ultraviolet radiation exposure.

## Colour

If the colour of the CST is not shown on the Drawings or other Contract documents, the colour as defined by AS 2700S must comply with Table 5.7.

Table 5.7: Default colour requirements

| Nominal colour | Colour defined by AS 2700S | |
| --- | --- | --- |
| Preferred colour | Acceptable alternatives |
| **Red** | R13 – Signal Red | R14 – Waratah  R15 – Crimson  R 53 – Redgum  R54 – Raspberry  R 62– Venetian Red |
| **Green** | G13 – Emerald Green | G16 – Traffic Green  G23 – Shamrock |
| **Blue** | B24 – Harbour Blue |  |
| **Yellow** | Y14 – Golden Yellow | Y13 – Vivid Yellow  Y42 – Mustard |
| **Terracotta** | R52 – Terracotta |  |
| **White** | N14 - White |  |

For a nominal colour (as listed in Table 5.7), the Contractor must use a single colour defined by AS 2700S for all of the Works. For example, swapping from R13 - Signal Red to R14 – Waratah is not permitted within a given locality.

# Constituent Materials

## General

The Quality Plan must include the following:

1. properties, manufacturer’s instructions, safety data sheets and other relevant details for the:
   1. materials used for cleaning the existing pavement surface (where required for removal of surface contaminants): type and source;
   2. priming material (for concrete pavement): type and source
   3. binder: type, source;
   4. pigment materials; and
   5. aggregate type, source, target particle size distribution and production tolerances, together with test results evidencing compliance with this Specification, including the friction rating;
2. evidence of registration (where applicable under Clause 6.4) of the materials or evidence of satisfactory previous performance (if applicable under Clause 6.5).

The materials used in the CST must be the same as those nominated in the Quality Plan. Substitution of materials is not permitted (refer Clause 7.9).

All test certificates must be prepared by a laboratory which is accredited for the test method to meet the requirements of AS ISO/IEC 17025 by National Association of Testing Authorities (NATA) or International Accreditation New Zealand (IANZ). Certificates must not be more than 6 months old when submitted to the Principal.

## Approved Products

Where a Principal’s Registration Scheme is in place for the supply of CST material, the material must be a registered product which has been approved in accordance with that scheme.

If a Principal’s Registration Scheme is not in place for the supply of CST material, the Quality Plan must include evidence of satisfactory performance of the proposed CST in a heavy urban traffic environment, including records of the texture, skid resistance and colour of the CST for a period of at least 5 years.

## Binder

The Contractor must ensure that the binder will achieve the performance requirements of this Specification. The use of paint or thermoplastic binders is not acceptable under this Specification.

## Aggregate

The aggregate must be clean, hard, angular, durable, free from dirt, clay and organic matter, of angular and uniform shape and uniform quality. Unless specified otherwise in the Contract documents, the aggregate must comply with this Clause 6.

The aggregate must be pigmented to colour match the final product if it is not encapsulated in binder as part of the treatment.

The aggregate must comprise of one of the following:

1. calcined bauxite;
2. recycled crushed glass (excluding glass beads);
3. natural sand;
4. a crushed aggregate sourced from a quarry where the source material complies with Clause 6.11; or
5. a manufactured aggregate or product in accordance with Clause 6.12.

Any recycled glass must be manufactured and tested for contaminants in accordance with the requirements in ATS 3050.

The source material used for any aggregate must comply with the Polished Aggregate Friction Value (PAFV) or the Polished Stone Value (PSV) specified in Table 6.11. Testing of calcined bauxite, recycled glass or natural sand for friction rating is not required.

Table 6.11: Friction rating

| Property | Test method | Minimum test frequency(1) | Acceptance criteria |
| --- | --- | --- | --- |
| PAFV (2) | Either:   * + AS 1141.40 and AS 1141.42; or   + AS 1141.41 and AS 1141.42 | 1 per 6 months of production | ≥ 55 |
| PSV | ATM 055 | 1 per 6 months of production | ≥ 55 |

Notes:

1. Unless the Principal approves a reduced frequency of testing.

The Contractor may submit a proposal to use manufactured products such as blast furnace slag as aggregate. Any such proposal must include evidence that the material meets the requirements of this Specification, including the information required under Clause 6.5.

# Construction

## General

The Quality Plan must include procedures, Inspection and Test Plans and/or the manufacturer's instructions for:

1. surface preparation, including cleaning of the existing surface, removal of loose and foreign materials and curing compounds;
2. supply and application of the priming material (if applicable);
3. binder mix quantities and tolerances on mixing components;
4. mixing of binder (and components);
5. pot life of binder, i.e. maximum time between mixing and application of binder;
6. the method of measuring the pavement surface temperature;
7. application of the binder, including limitations on placement temperatures;
8. curing of the CST;
9. use of accelerants to reduce the curing time of the binder (if applicable);
10. supply and application of protective sealers/additional layer of coloured binder (if applicable);
11. placement of the aggregate, including control of the spread rate;
12. the Minimum Pavement Curing period;
13. method to determine the actual binder application rate and the aggregate spread rate; and
14. clean up.

## Road Surface Preparation

The Minimum Pavement Curing Period must not be less than the longer of the period recommended by the manufacturer and the period specified in Table 7.2.

Table 7.2: Minimum pavement curing period

| Pavement surface | Minimum pavement curing period |
| --- | --- |
| Asphalt | 30 days |
| Concrete | 30 days |
| Spray seal | November to March: 3 months  Other times: 6 months |

The Contractor may submit a proposal to change the Minimum Pavement Curing Period specified in Clause 7.2. The Principal is under no obligation to accept any such proposal and may require an extended warranty period as a condition of acceptance.

Immediately prior to the application of the CST, the Contractor must clean and prepare the road surface to ensure that all raised pavement markers, oil, grease, dirt and any foreign material is removed from the road surface. The cleaning must be in accordance with the manufacturer’s instructions to ensure that the CST adheres to the road surface.

Cleaning and preparation must not cause damage to the road surface or structural damage to the pavement. If the pavement has been damaged by the removal of raised pavement markers, the pavement must be repaired prior to the application of the CST. All cleaning agents used to remove dirt, grime, fuel, oil and other materials from the existing surface and collected material must be removed from the Site and disposed in accordance with the environmental management requirements included in the Contract documents.

Prior to the application of CST, the Contractor must inspect the site to confirm the suitability of the road surface for the CST and prepare a report recording all relevant details of the inspection. The report must identify any areas of an existing pavement that require repair prior to the application of the CST. If requested by the Principal, the Contractor must permit the Principal to also attend the inspection.

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| **HOLD POINT 2** | |
| Process Held | Application of CST. |
| Submission Details | Report of the inspection must be submitted to the Principal at least 2 working days prior to the commencement of the application of the CST. However, if the report identifies that the existing pavement requires repair prior to the application of the CST, the Hold Point is not released until the repair is complete. |

Unless specified otherwise in the Contract documents:

1. the following must be masked to prevent the application of CST to the surface:
   1. the outside of the boundaries of the Lot, including kerb and channel;
   2. existing road surface delineation;
   3. raised pavement markers (if these have not been removed prior to the application of the CST);
   4. lifting mechanisms and joins between the lid and frame of pits so that the CST does not impede lifting and replacing lids;
   5. saw cuts that exist due to the installation of traffic detector loops (using tape less than 50 mm wide);
   6. drainage grates and frames; and
   7. service pits and valve covers less than 0.03 m²;
2. large pits and valve covers must not be masked so that the CST is applied to the surface.

## Application

The Contractor must apply the CST to achieve:

1. an effective bond between the binder and the road surface;
2. an effective bond between the binder and aggregate; and
3. a visually uniform, coloured surface with edges that provide a neat and clean line onto the adjacent surface.

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| **WITNESS POINT 1** | |
| Process | Application of CST |
| Notification Period | At least 1 working day (not less than 24 hours) before the commencement of the application of the CST. |

If the Contractor proposes to change the design from that approved by the Principal, the details of the revised design must be submitted to the Principal and Hold Point 1 will reapply.

The following applies to the application of the CST:

1. the surface on which the CST is to be placed must be dry;
2. precipitation or dew formation must not be occurring or likely to commence during application; and
3. the pavement temperature and weather conditions must be within the range specified in the manufacturer’s instructions or applicable installation procedure.

The Contractor must measure and record air temperature, any adverse weather conditions (e.g. dust, strong wind) humidity, dew point and pavement temperature at the Site. The records must be taken at the following times:

1. one hour before application of the binder; and
2. hourly thereafter until the binder is cured and the CST is ready for trafficking.

The pavement temperature must be measured using an infrared temperature gauge accurate to ± 2˚C. A wet/dry bulb hygrometer must be used to measure the dew point and relative humidity.

Priming material (where applicable), binder and aggregate must be uniformly applied over the area to be treated in accordance with the manufacturer’s instructions. The actual application rate of each constituent material must be recorded and included in the construction lot record for each Lot.

The Contractor must take all necessary precautions to:

1. prevent unintended application onto adjacent surfaces; and
2. protect the newly placed CST from damage and/or contamination until it has developed sufficient strength to carry vehicular traffic without damage.

The Contractor must record the following information immediately after completion of each Lot and submit a report containing this information to the Principal on the same day that the work is performed:

1. date, time of commencement of application, time swept and time opened to traffic;
2. location, width, area and any other relevant dimensions;
3. batch number;
4. weather conditions (refer Clause 7.11);
5. actual application rate of each constituent material (refer Clause 7.13); and
6. any non-conforming work and the proposed corrective action.
   1. In addition, this information must be included in the Lot Conformance Report (Refer Clause 9.7).

# Clean Up

All surplus material must be removed from the Site. Prior to opening the CST to traffic:

1. all masking tape must be removed; and
2. excess aggregate must be removed from the Site, including the roadway, kerb and channel, driveways and any adjacent trafficked and un-trafficked areas.

Unless directed otherwise by the Principal, the Contractor must inspect the Site at 1 day, 3 days and 14 days after placement and remove any loose material which has been identified at the inspection.

# Conformance

Unless specified otherwise in the Contract documents, from the time of placement until the end of the Defects Liability Period, the CST must have a visually uniform appearance and comply with the requirements in Table 9.1.

Table 9.1: Conformance requirements

| Property | Test method or inspection procedure | Test frequency | Requirement |
| --- | --- | --- | --- |
| Slip Resistance Value (SRV) (1) | AS 4663 Appendix A (2) | 5 tests from the first Lot (3)  Testing must be completed in the trafficked wheel paths (4) | Minimum mean SRV per Lot ≥ 55 British Pendulum Number, with no individual result < 50. |
| Surface Texture Depth(2) | ATM-250 (3) | 5 tests from the first Lot (4)  Testing must be completed in the trafficked wheel paths (5) | Level 1: ≥ 0.6 mm  Level 2: ≥ 1.0 mm |
| Colour | Refer Clause 9.3 | One per Lot. | The colour must be an approximate match to the specified colour |
| Delamination | Visual inspection | One per Lot. | Area of CST that has delaminated from underlying road surface:  ≤ 1% in any square metre; and  ≤ 0.1% of the total area of work. |
| Stripping or Ravelling | Visual inspection | One per Lot. | Area of CST that has stripped (i.e. loss of aggregate and/or binder):  ≤ 1% in any square metre; and  ≤ 0.1% of the total area of work. |

Notes:

1. Testing must be performed in the direction of vehicle travel using Slider 55 (TRL rubber) with temperature corrections applied to the SRV. The lane designation (inner wheel path, outer wheel path or between the wheel paths) must be reported for each test location.
2. If the category of Surface Texture Depth is not specified in the Contract documents, Level 1 applies.
3. Random stratified sampling in accordance with ATM-020 must be used to determine the longitudinal location of the test. However, the Principal may direct additional testing at any location prior to the expiry of the Defects Liability Period.
4. Additional testing of subsequent Lots is required where a non-conformance is recorded, or lots are not visually consistent with the first lot, unless directed otherwise by the Principal.
5. Additional tests may be specified in the Contract documents where cycleways/bike lanes or other pedestrian areas are treated.

Testing of each property specified in Table 9.1 must be carried out twice, at the following times:

1. Test 1 to be undertaken between 14 and 28 days after placement.
2. Test 2 to be undertaken no sooner than 2 months before the end of the Defects Liability Period.

The colour is to be assessed by a visual inspection carried out during daylight. The surface must be clean. If necessary, the surface must be lightly sprayed with water from a hand-held spray bottle so that the area being assessed is wet and then lightly wiped with a hand-held cloth. If requested by the Principal, the inspection must be a joint inspection. If the Principal does not agree with the Contractor’s assessment of the colour, the CST must be sampled and assessed in accordance with AS/NZS 1580.601.1. The colour is deemed to be conforming if rating 3 ‘approximate match’ or better is achieved.

The Principal may waive the requirement for testing of the surface texture following a visual inspection of the CST.

A Lot must comply with the following:

1. the Lot must be a single batch or area of like work which has been constructed under essentially uniform conditions and is essentially homogeneous with respect to material and appearance; and
2. the maximum area of the Lot is the lesser of the day’s production and 500 m2.

Discrete portions of a Lot which do not comply with Clause 8.4 must be excluded from the Lot and either treated as a separate Lot or rectified. Where the areas excluded from a Lot exceed 20% of the total lot area, the whole of the Lot is non-conforming and must rectified.

Within 5 working days of completing the testing, the Contractor must submit a Lot Conformance Report to the Principal including:

1. the information listed in Clause 7.15; and
2. test records (including records of the inspections) demonstrating compliance with Table 9.1.

# Maintenance and Repairs

The Quality Plan must include details of the proposed treatment to repair a Defect in the CST.

From the time of completion of the CST until the expiry of the Defect Liability Period, the Contractor must:

1. carry out any work necessary to protect and maintain the surface; and
2. repair any Defect so that the surface complies with the requirements of this Specification.

Where a Defect is repaired, the new CST must extend to the full width of the originally treated area and the other edges of the repair must be perpendicular to the lane lines.

The Contractor is not responsible for Defects caused by:

1. settlement or failure of the existing pavement (unless the pavement was constructed by the Contractor); and
2. damage (including gouging and fire damage) caused by traffic incidents.

The Contractor must undertake the repair within 28 days of becoming aware of a Defect. If the Defect is likely to create a hazardous situation for road users or the Principal advises that the repair is urgent, the repair must commence within 24 hours of the Contractor becoming aware of the Defect.

The following areas are excluded from this Clause 10:

1. all service pits and valve covers with a surface area < 0.03 m2;
2. traffic detector loops; and
3. existing road surface delineation and road markings

If the Contractor has repaired defective work, the Contractor must submit a report to the Principal within one month (or such other time directed by the Principal), which at a minimum includes the following information for each Defect:

1. the date the Contractor became aware of the Defect;
2. the date the Defect was rectified;
3. the method of rectification;
4. the dimensions of the new CST; and
5. a photographic record of the completed repair.

Annexure A: Summary of Hold Points, Witness Points and Records

The following is a summary of the Witness Points/Hold Points that apply to this Specification and the Records that the Contractor must submit to the Principal to demonstrate compliance with this Specification.

|  |  |  |  |
| --- | --- | --- | --- |
| **Clause** | **Hold Point** | **Witness Point** | **Record** |
| 4.1 | 1. Commencement of the application of CST |  | Quality Plan |
| 7.6 | 2. Application of CST |  | Record of Site inspection |
| 7.8 |  | 1. Application of CST | Notification Period, at least 1 working day (not less than 24 hours) before the commencement of the application of the CST |
| 9.7 |  |  | Report for each Lot |
| 10.7 |  |  | Report of Defect repairs |

Amendment Record

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| --- | --- | --- | --- |
| Amendment no. | Clauses amended | Action | Date |
| - | New specification | New | November 2023 |
| 1 | 1.2 Clarification of scope | Substitution | February 2025 |
| 1.3 Clarification of scope | New |
| 5.4 Additional details inserted | Substitution |
| 5.7 Clause revised | Substitution |
| 7.2, 7.3, 7.12, 7.15: Clauses revised and new details inserted | Substitution |
| 9.1 Clause revised | Substitution |
| 9.7 Clause revised | Substitution |

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| --- | --- |
| **Key** |  |
| Format | Change in format |
| Substitution | Old clause removed and replaced with new clause |
| New | Insertion of new clause |
| Removed | Old clauses removed |