8403 Coloured asphalt surface treatments

REVISION 30/7/12

8403.1 General
This supplementary specification shall be read in conjunction with:

a) MRS45, MRTS45.1;
b) MRTS04.1, Clause 4.1;
c) MRS01 “Introduction to Specifications”;
d) MRTS01 “Introduction to Technical Standards”;
e) MRS50 “Specific Quality System Requirements”;
f) MRTS50 “Specific Quality System Requirements”; and
g) The coating manufacturer’s specifications.

This supplementary requirement provides the specifications for the preparation, supply, and application of Coloured Surface Treatments to the areas nominated on the project drawings.

The use of thermoplastic binders is not within the scope of this specification, nor are paints, either solvent or water based. Hybrid acrylic polymer and epoxy cross linked systems are acceptable. Restricted use of untried products on a trial basis shall be subject to the approval of the Superintendent.

8403.2 Description of Work Items
The following work items are covered by this supplementary specification:

<table>
<thead>
<tr>
<th>Task Item No.</th>
<th>Description</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>8403</td>
<td>Supply and apply coloured surface treatment,</td>
<td>m2</td>
</tr>
<tr>
<td></td>
<td>[description/location]</td>
<td></td>
</tr>
<tr>
<td>8405</td>
<td>Preparation of surface for coloured surface</td>
<td>m2</td>
</tr>
<tr>
<td></td>
<td>treatment, [description/location]</td>
<td></td>
</tr>
</tbody>
</table>

8403.3 Test Methods and Australian Standards
The following test methods and Australian Standards shall be used in this supplementary specification:

a) AS 1580.601.1 “Colour – Visual comparison”;
b) AS 2700S “Colour Standards for General Purpose”;
c) Q704 “Skid Resistance (Portable Pendulum)”; and
d) Q705 “Texture Depth of Road Surfacing (Sand Patch)”.

8403.4 Quality System Requirements
8403.4.1 Hold Points and Witness Points

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 “Introduction to Technical Standards”.

The Hold Points, Witness Points and Milestones applicable to this supplementary specification are summarized in Table 8403.1

Table 8403.1 Layer Thickness Limits

<table>
<thead>
<tr>
<th>Clause</th>
<th>Hold Point</th>
<th>Witness Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>8403.6</td>
<td>1. Design of coloured surface treatment</td>
<td></td>
</tr>
<tr>
<td>8403.7</td>
<td></td>
<td>1. Preparation of Surface</td>
</tr>
</tbody>
</table>

8403.4.2 Construction Procedures

The contractor shall prepare documented procedures for all processes in accordance with Clause 5 of MRTS50 “Specific Quality System Requirements”.

In accordance with Clause 6 of MRTS50, the construction procedures associated with the Schedule Items of Clause 8403.2 are required to be submitted by the Contractor to the Superintendent. In addition to the requirements of Clauses 5 and 6 of MRTS50, the construction procedures shall include, as a minimum:

- a) Testing frequency (Clause 4.2.1.3.5);
- b) Nominated application rates (Clause 4.2.1.6.2);
- c) Arrangements for the removal of loose and foreign materials from the existing pavement surface if any, and a statement that the pavement is considered suitable for coating;
- d) Method to determine the actual binder application rate (Clause 4.2.1.6.3);
- e) Method to determine the actual aggregate spread rate (Clause 4.2.1.6.4);
- f) Method for the removal of surplus and waste materials (Clause 4.2.1.6.5);
- g) Documented evidence of prior use and longevity for similar application of the proposed Coloured Surface Coating to no less than 6 years in heavily trafficked areas; and
- h) Details of any deviations from this supplementary specification that are required in order to place the Coloured Surface Treatment in accordance with the manufacturer’s instructions. These manufacturer’s instructions must be attached to the construction procedures (Clause 4.2.1.6.6).

8403.5 Materials

8403.5.1 General

Materials used in the work must be equal in quality to the sample tested for the purpose of design. If requested by the Superintendent, the Contractor is to provide, at no cost to the Principal, representative samples of constituent materials to the Superintendent. Material Safety Data Sheets (MSDS) must be supplied for the cleaning materials, priming materials, binder, binder components, aggregate and aggregate coating proposed for use in the work. Coloured Surface Treatments and all components thereof must be free from lead and be UV stable.
8403.5.2 Aggregate

8403.5.2.1 General
Aggregate must consist of clean, dry, hard, tough, durable, moderately sharp grains of either natural stone or synthetic material, of uniform shape and quality, free from dust, dirt, clay, organic matter and other deleterious matter, resistant to fuel and oils spills from traffic, able to withstand traffic stresses without damage, and able to be broomed and cleaned with high pressure water without damage. The following aggregate details shall be provided to the Superintendent at least 14 days prior to the start of works:

a) Aggregate type, source and gradation;
b) Manufacturer’s or Contractor’s recommendations/instructions for placement of aggregate including spread rate; and
c) Polished stone value of the aggregate.

In the case of systems where the binder is moisture sensitive (for example, urethanes) the aggregate must be dry, stored and transported under cover at all times, unless otherwise specified in the Construction Procedures.

8403.5.2.2 Nominal Size
The particle size distribution shall comply with the requirements of Table 8403.2.

Table 8403.2 Particle Size Distribution

<table>
<thead>
<tr>
<th>AS Sieve Size (mm)</th>
<th>% Passing by Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.75</td>
<td>100</td>
</tr>
<tr>
<td>2.36</td>
<td>95 – 100</td>
</tr>
<tr>
<td>0.600</td>
<td>0 – 20</td>
</tr>
<tr>
<td>0.075</td>
<td>0 – 1</td>
</tr>
</tbody>
</table>

8403.5.2.3 Colour
Where the Coloured Surface Treatment has been nominated, on the project drawings, to be applied to a Cycleway, the colour of aggregate applied to asphalt must be an approximate match (AS/NZS 1580.601.1) to one of Australian Standard Green colours of AS 2700 as listed in Clause 13.11.4. Aggregate may be coated with coloured polymer resin to facilitate compliance with colour specifications detailed in this clause and Clause 4.2.1.7.4.

Where the Coloured Surface Treatment has been nominated, on the project drawings, to any other area, other than a Cycleway, then the colour of the aggregate applied to asphalt must be an approximate match (AS/NZS 1580.601.1) to the colour specified on the project drawings.

8403.5.3 Pigmented Binder System
The binder must be a two or more component thermosetting resin suitably pigmented to provide the necessary depth of specified colour in the finished surface coating, and provide adhesion to aggregate and substrate. At the time of mixing and application to the pavement surface, the binder must have a sufficient pot life to facilitate the application of a uniform thickness of coating and achieve adhesion to pavement and aggregate under the prevailing ambient temperatures.
8403.5.4 Priming Materials
Priming materials must be applied to the pavement surface prior to the application of the Coloured Surface Treatment, if recommended by the manufacturer.

8403.5.5 Sampling and Testing
All materials used in the work must be sampled and tested to verify conformity to the requirements of this requirement and the Contractor’s construction procedures. The Contractor’s construction procedures must nominate the proposed testing frequency which must not be less than that specified in Table 8403.3. Where a minimum frequency is not specified, the Contractor must nominate an appropriate frequency in the construction procedures. Binder thickness may be measured during application. All other tests including Q704 must be performed between 1 and 12 months from application.

Table 8403.3 Minimum Frequency of Testing
Lot size must not exceed the area surfaced in one shift on one site.

<table>
<thead>
<tr>
<th>Clause</th>
<th>Characteristic Analysed</th>
<th>Test Method</th>
<th>Minimum Testing Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>8403.8.3</td>
<td>Binder Thickness</td>
<td></td>
<td>In accordance with the Contractor’s Construction Procedure</td>
</tr>
<tr>
<td>8403.9.1</td>
<td>Surface Texture</td>
<td>Q705</td>
<td>1 per lot</td>
</tr>
<tr>
<td>8403.9.2</td>
<td>Surface Friction</td>
<td>Q704</td>
<td>2 per 50 m²</td>
</tr>
<tr>
<td>8403.9.3</td>
<td>Delamination and Ravelling</td>
<td></td>
<td>In accordance with the Contractor’s Construction Procedure</td>
</tr>
<tr>
<td>8403.9.4</td>
<td>Colour</td>
<td>AS 1580.601.1</td>
<td>1 per lot</td>
</tr>
</tbody>
</table>

8403.6 Design of Coloured Surface Coatings
The coloured surface coating shall be designed in accordance with supplier’s recommendations to suit the specified application. The Contractor shall submit details of the proposed design to the Superintendent at least seven days prior to commencement of work. The proposed design shall include:

a) Supporting test certification for the nominated materials; and
b) Design verification documentation.

The submitted design must be referred to as the “nominated design”. The nominated design must include the following details:

a) Cleaning and priming materials (if the system uses a primer) – type, source, and method of application;
b) Application rates of binder, priming materials (if the system uses a primer) and aggregate including tolerances;
c) Explicit coating rate of top coat coloured binder in the case of low viscosity (for example, acrylic) systems;
d) Aggregate – source, geological type, nominated particle size distribution and manufacturing process;
e) Binder – type and source, manufacturer’s specification, curing time/temperature characteristics; and
f) Colour – pigment type.

If the Contractor proposes to vary the nominated design, a new nominated design shall be submitted in accordance with this clause.

8403.7 Surface Preparation
All loose material, grit, stones, vegetative matter and rubbish shall be removed from the area of works prior to placement of high friction surface treatment. If required to ensure that dust, laitance and other loose or deleterious material is removed, the Contractor shall clean and prepare the pavement surface prior to applying the Coloured Surface Treatment. The Contractor shall evaluate the cleanliness and suitability of the surface according to the manufacturer’s instructions and if necessary shall take steps such as cleaning and priming to improve suitability of the surface. The site may be further cleaned and prepared as required by the Superintendent. Cleaning and preparation shall not cause structural damage to the pavement. The Contractor shall provide the Superintendent with written notice of intention to commence preparation of surface, for each location, at least seven days before preparation commences. All cleaning agents and collected material shall be removed from site in accordance with EPA requirements for the type of waste generated. Arrangements for the removal and disposal of loose and foreign materials must be detailed in the construction procedures. Priming material (if used) applied to the road surface must be protected from contamination and trafficking prior to application of the binder.

8403.8 Application of Coloured Surface Coatings
8403.8.1 General
The Contractor must target the nominated design and control the process to achieve:
   a) Uniform application of binder and aggregate in accordance with the nominated design with adequate adhesion to the underlying surface;
   b) Aggregate particles shall be uniformly applied over the whole of the treated area; and
   c) Effective bond between binder and aggregate.

Coloured Surface Treatments must comprise a continuous application over the specified area. Bars and stripes of Coloured Surface Treatment are not permitted unless otherwise specified or required by the contract documents. The Coloured Surface Treatment must be capable of withstanding normal street cleansing operations, including brooming. The use (if any) of accelerators/catalysts and heat to increase curing rate must be strictly in accordance with the binder manufacturer’s recommendations which must be attached to the construction procedures.

8403.8.2 Pavement Temperature and Weather Conditions
The Contractor shall measure and record ambient air and pavement temperatures at least every two hours during conduct of the work. For this purpose a suitable thermometer or temperature gauge, accurate to ± 2°C, must be used and time intervals between temperature measurements must not exceed two hours. In the case of urethanes, a wet/dry bulb hydrometer must be used to report the dew-point or relative humidity. The temperature results shall be provided to the Superintendent. If the work is performed in daylight hours and pavement is partly in sun and partly in shade, the cooler shade temperature will determine the cure of the whole work, so the shade
temperature must be monitored by the Contractor. The application of Coloured Surface Treatment shall be carried out only on dry pavement. The application of Coloured Surface Treatment shall not be carried out after dew point, when rain appears imminent or during high winds or dust storms.

8403.8.3 Application of Binder
Binder must be applied in uniform thickness and at a rate in accordance with the nominated design. The work area must be treated in a suitable number of lots. Low viscosity binders such as acrylics require an additional application after the aggregate is broadcast. After each application of binder to each lot, the quantity of material used must be checked against the area covered and any necessary adjustments made to ensure that the specified or agreed rate of application is maintained in subsequent applications. The method to determine the actual binder application rate must be detailed in the construction procedures. Any masking tape used on boundaries of application areas must be affixed firmly and consistently to prevent binder bleeding under and past the tape.

8403.8.4 Application of Aggregate
Aggregate must be applied at a uniform rate across all of the binder, and adequately embedded in the binder. The aggregate must be dry at the time of application. After the application of the binder and aggregate, a period of at least the minimum time recommended by the binder supplier, or such longer period as may be necessary for the binder to cure, must elapse before the area is opened to traffic. During this curing period, traffic must be kept off the treated surface. Any bare or insufficiently covered areas must be re-covered as necessary to give a uniform and complete surface coverage within the specified time. After the application of aggregate to each lot, the quantity of material used must be checked against the area covered and any necessary adjustments made, to ensure that the specified or agreed rate of application is maintained in subsequent applications. The Contractor shall describe the method to determine the actual aggregate spread rate in the construction procedures.

8403.8.5 Clean Up of Work
Immediately following application of the Coloured Surface Treatment, all masking material must be removed, together with any binder or aggregate adhering to same. During the cure period, the Contractor shall ensure that no contamination, disturbance or trafficking of the coated surface occurs. After initial curing, excess aggregate must be removed by a vacuum sweeper or equivalent means. The Contractor shall describe in the construction procedures the method and timing of removal of excess aggregate. When the aggregate has been evenly applied and the binder has cured, any remaining aggregate spread in excess of the specified or ordered rate must be removed from the pavement surface prior to opening to traffic. A vacuum sweeper shall be used to remove any loose aggregate from the work and/or the proximity of the works until the surfacing is no longer losing any aggregate. The loose aggregate shall be vacuum swept or equivalent means once a week for four weeks, or unless otherwise determined by the Superintendent.

8403.8.6 Work Record
Details of the work performed must be recorded and verified by the Contractor and made available to the Superintendent on request. The location, width, area, application rates of binder, priming material and aggregate, together with details of the temperature/s must be recorded immediately after completion of each lot.

8403.9 Finished Surfacing Properties
8403.9.1 Surface Texture
The surface texture of the Coloured Surface Treatment must be measured in accordance with Q705. The frequency of testing must be in accordance with Table 8403.3. Throughout the defects liability period, the surface texture must be a minimum of 0.6mm.

8403.9.2 Frictional Characteristics
The frictional characteristics of the Coloured Surface Treatment must be determined in accordance with Q704. Testing must be performed 2 to 4 weeks after the coating was applied. The minimum SRV shall be minimum 55 and maximum 80 unless otherwise specified by Mackay Regional Council. The frequency of testing must be in accordance with Table 8403.3.

8403.9.3 Delamination and Ravelling
Throughout the defect period, all delamination and raveling must be rectified. At any time during the defect period, the area of the work which has delaminated or raveled must not exceed 1% in any square metre and 0.1% of the total area of work.

8403.9.4 Colour
Cycleways must be Colour G13 Emerald in accordance with Australian Standard AS 2700 S – 1996.

Approximate match of colour must be determined in accordance with AS/NZS 1580.601.1. If the Contractor and the Superintendent disagree on colour assessment by the specified method of approximate match, and instrument such as a Minolta Chroma Meter (CIE 1931, DG65/45/0) shall be used for assessment and the colour of the surfacing must be within the approximate rectangular colour space with CIE (x,y) coordinates as follows:

a) The initial green colour must be defined within an approximate trapezoidal colour space with the coordinates: (0.32, 0.50) ; ((0.33, 0.38) ; (0.30, 0.36) ; (0.19, 0.41)
b) During and at the end of the defect period, the green must lie within the following space: (0.32, 0.50) ; ((0.33, 0.38) ; (0.30, 0.35) ; (0.19, 0.41)
c) The Y value, brightness or reflectance, must lie within the limits 8-19.

For Coloured Surface Treatment to areas not designated as Cycleways, the colour is to be in accordance with the project drawings.

8403.9.5 Nonconformity
If a section or area of Coloured Surface Treatment fails to achieve conformity to this supplementary specification, initially or during the Defects Liability Period, such failure must constitute a Nonconformance. The nonconforming section or area of Coloured Surface Treatment must be rectified or replaced.

8403.9.6 Odour
The Coloured Surface Treatments shall not emit offensive odours after opening to traffic, such that complaints are received by Mackay Regional Council. The Superintendent shall determine if the high friction surface treatment is producing offensive odours, and if the material is therefore unacceptable. The Superintendent’s decision will be final.

8403.10 Work Operations
8403.10.1 Item 8403 Supply and apply Coloured Surface Treatment
Work Operations incorporated into this item include:
a) Work operations included in Clause 2.1.5 of MRS01 “Introduction to Specifications”;  
b) Selection and supply of constituent materials including design of application rates; and  
c) Application of the Coloured Surface Treatment included the application of priming materials.

8403.10.2 Item 8405 *Preparation of surface for Coloured Surface Treatment*  
Work Operations incorporated into this item include:

a) Work operations included in Clause 2.1.5 of MRS01 “Introduction to Specifications”;  
b) Collecting and removing loose materials; and  
c) Supplying and applying cleaning agents.

8403.11 Measurement and Payment  
Work Operations under this specification shall be claimed under the items listed in Clause 8403.2, as measured by the total number of square metres shown in the project drawings.