

# Roads

## Master Specification

### RD-LM-C1 Application of Pavement Marking

#### Document Information

|                   |             |
|-------------------|-------------|
| KNet Number:      | 13623471    |
| Document Version: | 2           |
| Document Date:    | August 2020 |

DEPARTMENT FOR  
INFRASTRUCTURE  
AND TRANSPORT



**Government of South Australia**  
Department for Infrastructure  
and Transport

## Document Amendment Record

| Version | Change Description   | Date        |
|---------|--|-------------|
| 1       | Initial issue (formerly R46 – Application Of Pavement Marking) | 28/06/19    |
| 2       | Formatting for publishing                                      | August 2020 |
|         |  |             |
|         |  |             |
|         |  |             |

## Document Management

This document is the Property of the Department for Infrastructure and Transport and contains information that is confidential to the Department. It must not be copied or reproduced in any way without the written consent of the Department. This is a controlled document and it will be updated and reissued as approved changes are made.

Contents

|   |    |
|---|----|
| Contents                                    | 3  |
| RD-LM-C1 Application of Pavement Marking    | 4  |
| 1 General                                   | 4  |
| 2 Quality Requirements                      | 4  |
| 3 Contractor Accreditation                  | 4  |
| 4 Materials                                 | 5  |
| 5 Application of Pavement Marking           | 5  |
| 6 Raised Pavement Markers (PCCP Class 25-1) | 12 |
| 7 Pavement Bars (PCCP Class 25-1)           | 12 |
| 8 Retroreflectivity                         | 13 |
| 9 Skid Resistance                           | 14 |
| 10 Test Procedures                          | 14 |
| 11 Hold Points                              | 14 |
| 12 Verification Requirements and Records    | 15 |
| 13 Measurement                              | 15 |

## RD-LM-C1 Application of Pavement Marking

### 1 General

This Part specifies the requirements for the application of pavement marking.

#### Definitions

1.1 The following definitions apply to terms used in this Part:

| Term                   | Definition  |
|------------------------|---|
| Line Marking           | All longitudinal lines.   |
| Road Marking           | Transverse lines, arrows, symbols, chevrons, diagonals, messages and traffic island and median kerbing.             |
| Pavement Marking       | The supply and application of line marking, road marking, pavement bars and raised pavement markers.                |
| New Work               | The supply and application of pavement marking to an unmarked surface or the modification of existing markings.     |
| Maintenance Repainting | The supply and application of a single coat of paint to a previously painted surface.                               |
| PCCP                   | Painting Contractors Certification Program (refer <a href="http://www.apas.gov.au/pccp">www.apas.gov.au/pccp</a> ). |

1.2 Other terms shall be as defined in the Department's Pavement Marking Manual, available from: <https://www.dpti.sa.gov.au/standards/tass>.

### 2 Quality Requirements

2.1 The Contractor shall prepare and implement a Quality Plan vide Part PC-QA1 "Quality Management Requirements" that includes detailed procedures, documentation and Work Instructions for pavement marking activities and ensuring required Performance Standards are met including the below:

- ensuring that the plant, processes and personnel used to apply pavement marking comply with the specified certification requirements and are capable of delivering the quality of marking required;
- controlling the quality of materials used;
- verifying that materials have been applied at the specified application rates; and
- verifying that the field performance meets specified requirements.

2.2 If not submitted beforehand, the procedures shall be submitted at least 28 days prior to the commencement of site work.

2.3 Submission of the Quality Management Plan shall constitute a **Hold Point**.

### 3 Contractor Accreditation

3.1 "PCCP" means Painting Contractors Certification Program (refer [www.apas.gov.au/pccp](http://www.apas.gov.au/pccp)).

3.2 The Works shall be undertaken by a company that has PCCP accreditation appropriate for the type of work being undertaken in accordance with Table RD-LM-C1 3-1.

**Table RD-LM-C1 3-1 PCCP Accreditation**

| Class | Accreditation Class Description                                  | Materials | Sub-class  |
|-------|--|-----------|------------|
| 21    | Long-run longitudinal pavement marking on major roads            | Paint     | Class 20-1 |
| 22    | Short to medium-run longitudinal pavement marking on minor roads | Paint     | Class 21-1 |
| 23    | Pavement marking; Car park                                       | Paint     | Class 22-1 |

| Class | Accreditation Class Description                                 | Materials                  | Sub-class  |
|-------|---|----------------------------|------------|
| 24    | Transverse pavement marking including intersections & messaging | Thermoplastic              | Class 24-2 |
|       |   | Multi-component / CAP      | Class 24-3 |
|       |   | Non-skid Paint             | Class 24-4 |
| 25    | Raised Pavement Marker / Pavement Bar Installation              |                            | Class 25-1 |
| 26    | High Friction Surfacing   | Coloured Bus / Cycle Lanes | Class 26-2 |
| 27    | Pavement marking; Removal                                       |                            | Class 27-1 |

## 4 Materials

- 4.1 All pavement marking materials shall comply with RD-LM-S1 "Materials for Pavement Marking".

## 5 Application of Pavement Marking

### General

- 5.1 Markings shall be as detailed on the Drawings and in accordance with the Department's Pavement Marking Manual.
- 5.2 The application of pavement marking to the road surface shall only take place under the following conditions:
- when the surface is dry and free from foreign matter (e.g. oil, loose material, sealing aggregate, etc.);
  - at air temperatures  $>10^{\circ}\text{C}$ ; and
  - when relative humidity is  $<85\%$ .
- 5.3 Subject to prior approval, the manufacturer's written recommendations shall be used if at variance with these criteria. All data shall be recorded in the daily diary.
- 5.4 The Contractor shall undertake mechanical or hand brooming if the first condition above cannot be achieved by use of a surface cleaning apparatus incorporated in the line marking machine.
- 5.5 Unless specified the Contractor is responsible for:
- the application process and application rates of the paints, beads and other additives to provide the specified colour, luminance, retroreflectivity and skid resistance;
  - selection of the directions of spraying and the number of coats of paint, beads and other additives required to meet the requirements of this specification;
  - selection of the appropriate thermoplastics, cold applied plastics (CAP) or other where high performance pavement marking is required;
  - all preparation works to ensure that all of the manufacturer's instructions have been met and the pavement is properly prepared and cleaned prior to the application of materials;
  - obtaining the traffic volumes of the road from <http://location.sa.gov.au/viewer/>, to ensure the appropriate materials and application of pavement marking is used to meet the required Performance Standards; and
  - ensuring that traffic growth of 10% per year is allowed for.

### Protection of Work

- 5.6 Until full curing of the pavement marking has been achieved, the Contractor shall ensure that all work is protected from traffic damage by the use of cones and signs in accordance with AS 1742.3, Clause 3.9.1.
- 5.7 If "pick-up" is evident the Contractor shall obliterate any "re-distributed" material caused by vehicles passing over uncured work by removing and / or covering the "re-distributed" material with a treatment of appropriate colour and type to match the existing road surface.

- 5.8 The Contractor shall reapply pavement marking damaged by vehicles passing over uncured work.
- 5.9 Longitudinal line marking shall be considered damaged where the initial retroreflectivity measured within 10 days of application using a calibrated low angle retroreflectometer using 30 metre geometry is below 240 mcd/m<sup>2</sup>/lx.

## Spotting Alignment

- 5.10 For new work, the Contractor shall carry out spotting prior to the application of all pavement markings. Following spotting, the Contractor shall give 24 hours' notice before any pavement marking is applied.
- 5.11 Provision of the above notice shall constitute a **Hold Point**.

## Paint Application - General

- 5.12 New work means the supply and application of pavement marking to an unmarked surface or the medication of existing markings.
- 5.13 For new or resurfaced spray seals or asphalt roads, the following minimum requirements shall be met:
  - a) Newly laid spray seal shall be left to cure for a minimum of 7 days prior to the application of the first coat of paint (primer/base coat) and temporary retroreflective raised pavement markers (TRRPM) shall be installed to provide temporary line marking. The Contractor shall leave TRRPM in place until the final coats of paint or permanent RRPMS are installed;
  - b) At the final visit, the Contractor shall apply a minimum of two coats of paint to ensure that all new works meet the performance criteria of this specification. The retroreflectivity requirements shall be met in both directions of traffic flow on all separation lines;
  - c) Traffic speed restrictions can be removed once the first coat of paint (primer/base coat) has been placed for all line makings and the retro-reflectivity readings are above the minimum intervention level of 125 mcd; and
  - d) Until installation of the separation line, the Contractor shall maintain appropriate signage in accordance with AS 1742 (e.g. T3-12 "No lines do no not overtake unless safe") and Part PC-SM1 "Traffic and Pedestrian Management".
- 5.14 Unless specified otherwise, longitudinal line work in rural areas shall be undertaken with a Class A line marking machine. Longitudinal line marking in the metropolitan area shall be undertaken with a Class A line marking machine if practicable, otherwise a Class B line marking machine shall be used. Refer to the PCCP for details of Class A and Class B line marking machines.
- 5.15 Hand spraying with the use of templates to control the pattern and shape will be allowed for transverse lines, chevrons, diagonals, pavement messages, symbols and traffic island and median kerbing.
- 5.16 Where two coats of paint are to be applied for separation lines on carriageways with two-way traffic, the coats shall be applied in opposite directions. Paint for separation lines on carriageways with one-way traffic and all edge lines shall be applied in the direction of traffic.
- 5.17 Where two coats of paint are to be applied, the first coat shall be adequately cured prior to the application of the second coat. All paint and beads shall be evenly applied to the markings.
- 5.18 The time and date of installation of regulatory lines shall be recorded and the Contractor shall forward this information within 5 working days.

## Longitudinal Paint Systems

- 5.19 The longitudinal paint system shall be as described in Table RD-LM-C1 5-1:

**Table RD-LM-C1 5-1 Longitudinal Paint System**

| Treatment                        | Materials   | Typical Application  |
|----------------------------------|---|--|
| Standard                         | Paint and Type B high retroreflectivity drop on beads (traditionally referred to as “virgin”, “pristine” or “high refractive index” beads). | Roads where standard performance and limited wet weather reflectivity is acceptable.   |
| Large Beads                      | Paint and Type D-HR large beads.  | High traffic volume roads where enhanced performance and wet weather retro-reflectivity is required. This treatment will typically halve maintenance requirements.   |
| Large Bead / Glass Anti-Skid Mix | Paint and Type D-HR large bead / glass anti-skid mix.   | High traffic volume roads where enhanced performance and wet weather retroreflectivity is required and skid resistance shall be provided on a smooth road surface. This treatment will typically halve maintenance requirements. |

5.20 Large beads and / or the Large Bead / Glass Anti-Skid Mix shall be used when specified by the Principal.

## Transverse “Non-Skid” Marking Systems

5.21 The transverse paint system shall be as described in Table RD-LM-C1 5-2:

**Table RD-LM-C1 5-2 Transverse Paint System**

| Treatment                               | Materials   | Typical Application  |
|---|---|--|
| Standard                                | Premixed paint and crushed quartz.  | Roads and intersections where skid resistance is required but no retroreflectivity.  |
| High performance Multi Component        | 2 part cold applied material, aggregate and Type D-HR large beads with an adhesion coating.             | High traffic volume roads and intersections with a large number of heavy vehicles where enhanced performance and dry and wet weather retroreflectivity is required. This treatment will typically have a 5 year life span. |
| High Performance Pre-Form Thermoplastic | Thermoplastic material and anti- skid mixture containing Type C Intermix glass beads and crushed glass. | High traffic volume roads and intersections where enhanced performance and retroreflectivity is required. This treatment will typically have a 5 year life span.   |

5.22 High performance markings shall be used when specified by the Principal.

## Longitudinal Paint Application (PCCP Class 20-1 and 21-1)

### New Work

5.23 Standard Treatment:

- a) Two coats of paint shall be applied during the same site visit.

5.24 Large Beads and Large Bead / Glass Anti-Skid Treatment:

- a) Two coats of paint shall be applied. The first coat shall be the Standard Treatment and the second coat the Large Bead Treatment.

- 5.25 Two coats of paint shall be applied together with a concurrent application of beads. The first coat shall be fully cured prior to the application of the second coat. The timing of the application of paint shall comply with any requirements specified by the Principal.
- 5.26 Until installation of the separation line, the Contractor shall maintain appropriate signing in accordance with AS 1742 (e.g. T3-12 "No lines do not overtake unless safe") and PC-SM1 "Traffic & Pedestrian Management".

#### Maintenance Repainting

- 5.27 One coat of the specified paint treatment shall be applied together with a concurrent application of glass beads.

### Transverse "non-skid" paint application (PCCP Class 24-4)

#### New Work

- 5.28 Two coats of pre-mixed paint and crushed quartz shall be applied during the same site visit. The first coat shall be fully cured prior to the application of the second coat.

#### Maintenance Repainting

- 5.29 One coat of pre-mixed paint and crushed quartz shall be applied.

#### Transverse high Performance pavement marking application

- 5.30 **Multi Component** (PCCP Class 24-3) consists of a 2 part cold applied pavement marking material applied according to the manufacturer's recommendations and comprising:
- a) a base coat;
  - b) aggregate;
  - c) a top coat to encapsulate the aggregate; and
  - d) type D-HR beads with an adhesion coating.
- 5.31 The aggregate and beads shall be applied while the material is fluid to ensure embedment and shall be evenly distributed to provide a complete coverage.
- 5.32 **Pre-Form Thermoplastic Pavement Marking** (PCCP Class 24-2) consists of pre-formed thermoplastic pavement marking material applied according to the manufacturer's recommendations. An anti-skid mixture containing Type C Intermix glass beads and crushed glass shall be applied immediately after heating while the material is still liquid. The mixture shall be evenly distributed to provide a complete coverage of the surface of the thermoplastic.

### Coloured Pavement Surfacing Application (PCCP Class 26-2)

- 5.33 Coloured pavement surfacings are for use on pavement designated as bus or cycle lanes and shall be in accordance with Department's Pavement Marking Manual.
- 5.34 **Multi Component** consists of a suitably pigmented 2 part cold applied pavement marking material applied according to the manufacturer's recommendations and comprising:
- a) a base coat;
  - b) aggregate; and
  - c) a top coat to encapsulate the aggregate.
- 5.35 The aggregate shall be applied while the material is fluid to ensure embedment and shall be evenly distributed to provide a complete coverage.
- 5.36 **Pigmented Binder System** consists of a 2 or more component thermosetting resin suitably pigmented to provide the necessary depth of specified colour in the finished surface coating and the application of coloured aggregate. The aggregate shall be applied while the material is fluid to ensure embedment and shall be evenly distributed to provide a complete coverage of the treated area.



## Kerb Treatment

### New Work

- 5.37 The concrete surface of the kerb shall be dry and adequately cured prior to the application of paint, and any curing agents used shall be removed by an appropriate means. The paint shall be applied in one or more coats to achieve the specified minimum dry thickness. Glass beads shall be applied to the final coat immediately following the application of paint to ensure embedment and retention.

### Maintenance Repainting

- 5.38 The Contractor shall remove and dispose of any lifting or flaking paint coatings, rubbish, grass and vegetation to achieve a sound surface prior the application of paint. Repainting shall consist of a single application of paint to achieve the specified minimum dry film thickness. Glass beads shall be applied immediately following the application of paint to ensure embedment and retention. The Contractor shall ensure that "over-spray" does not cause paint contamination to adjacent surfaces.

## Glass Bead and Glass Bead / Anti-Skid Application

- 5.39 All beads and bead / anti-skid mix shall be applied using a method that ensures uniform cover and retention to the surface of the marking, and minimal wastage of material. The Contractor shall ensure excessive application of material, which may present a hazard for road users, does not occur. Glass beads and glass bead / anti-skid mix shall be applied immediately following application of pavement marking material to ensure embedment and retention.

## Pavement Marking Application Rates

- 5.40 Pavement marking and additives shall be applied in accordance with Table RD-LM-C1 5-3.
- 5.41 Written verification of all application rates shall be provided, vide Clause 12 "Verification Requirements and Records".

**Table RD-LM-C1 5-3 Pavement Marking Application**

| Item To Be Treated   | Paint                       |        |                   | Additive   |   |
|--|-----------------------------|--------|-------------------|--|---|
|  | Type                        | Colour | Film Thickness    | Type   | Rate  |
| Longitudinal Lines Standard Beads                                  | Waterborne pavement marking | White  | Wet 300 – 375 um. | Type B High Retroreflectivity Drop-on Glass Beads                        | Min. Retained 275 g/m <sup>2</sup>                    |
| Longitudinal Lines Large Beads                                     | Waterborne pavement marking | White  | Wet 600 um.       | Type D-HR Large wet weather Glass Beads                                  | Min. Retained 500 g/m <sup>2</sup>                    |
| Longitudinal Lines Large Bead / Glass anti-skid mix                | Waterborne pavement marking | White  | Wet 600 um.       | Type D-HR Large wet weather Glass Bead and 1 mm – 2 mm crushed glass mix | Min. Retained 750 g/m <sup>2</sup><br>Mix Ratio 70:30 |
| Pavement messages, symbols, chevrons, diagonals & transverse lines | Waterborne pavement marking | White  | Dry 250 – 350 um. | Premixed with Crushed Quartz   | Min. 0.50 kg/L  |

| Item To Be Treated   | Paint                                   |                 | Additive  |  |  |
|--|---|-----------------|---|--|--|
| Pavement messages, symbols, chevrons, merge arrows, diagonals & transverse lines | High Performance Multi Component        | White<br>Yellow | Base coat 1mm<br>Top coat 0.5 mm  | 1-3 mm aggregate<br>Type D-HR<br>Large wet weather Glass Beads with adhesion coating | 400 gm/m <sup>2</sup><br>400 gm/m <sup>2</sup>     |
|  | High Performance Pre-Form Thermoplastic | White<br>Yellow | Pre-Form Thickness 2.5 mm ± 0.5 mm                                      | Type C Intermix Glass Bead and 1 mm – 2 mm crushed glass mix                         | 1.60 Kg/m <sup>2</sup> retained<br>Mix Ratio 70:30 |
| Bus and Cycle Lanes  | Multi Component                         | Various         | Base coat 1 mm<br>Top coat 0.5 mm                                       | 1-3 mm aggregate   | 1.50 Kg/m <sup>2</sup>                             |
|  | Pigmented Binder                        | Various         | Binder Uniform thickness to provide adhesion to aggregate and substrate | 1-3 mm aggregate   | Complete coverage of treated area                  |
| Traffic island and median kerbing  | Latex exterior flat or low gloss        | White           | New: dry 60 – 90 um.<br>Maintenance: dry 40 – 60 um.                    | Type B High Retroreflectivity Drop-on Glass Beads                                    | Min. Retained 275 g/m <sup>2</sup>                 |
| Pavement bars  | Latex exterior flat or low gloss        | Yellow          | New: dry 60 – 90 um.<br>Maintenance: dry 40 – 60 um.                    | Type B High Retroreflectivity Drop-on Glass Beads                                    | Min. Retained 275 g/m <sup>2</sup>                 |
| Clearway markings  | Waterborne pavement marking             | Yellow          | Wet 300 – 375 um.   | Type B High Retroreflectivity Drop-on Glass Beads                                    | Min. Retained 275 g/m <sup>2</sup>                 |
| No standing zones  | Waterborne pavement marking             | Yellow          | Wet 300 – 375 um.   | Type B High Retroreflectivity Drop-on Glass Beads                                    | Min. Retained 275 g/m <sup>2</sup>                 |
| Blacking-out   | Waterborne pavement marking             | Black           | Dry 250 – 350 um.   | Premixed with Crushed Quartz   | Min. 0.50 kg/L                                     |
| Rail crossing box hatchings  | Waterborne pavement marking             | Yellow          | Dry 250 – 350 um.   | Premixed with Crushed Quartz   | Min. 0.50 kg/L                                     |

## Placement of Markings

5.42 For maintenance repainting, the existing road markings shall be repainted to restore the original size, shape and line pattern. Pavement marking shall be placed on the road surface in correct position within the following tolerances specified in Table RD-LM-C1 5-4.

**Table RD-LM-C1 5-4 Placement of Markings**

|                 | New Work | Maintenance Repainting |
|-----------------|----------|------------------------|
| <b>Spotting</b> |          |                        |

|  | New Work  | Maintenance Repainting  |
|--|---|---|
| Line marking                                 | + - 50 mm of pavement / seal centre or to surveyed design strings | -   |
| Road marking                                 | + - 50 mm of drawing dimensions and control lines                 | -   |
| Road marking                                 | + - 25 mm in relation to "spotting"                               | Areas shall not be less than existing shape and size and not more than 10 mm greater than the existing all round (i.e. 0, + 10 mm). |
| <b>Line Marking</b>                          |   |   |
| Edgeline distance from centreline            | + - 25 mm   | -   |
| Resultant lane width                         | + - 50 mm   | -   |
| Lateral deviation from "spotting"            | + - 25 mm   | -   |
| Stripe width                                 | + 10, - 0 mm  | + 10, - 0 mm  |
| Stripe length, less than 12 m                | + 150, - 0 mm   | + 150, - 0 mm   |
| Stripe length, greater than 12 m             | + 300, - 0 mm   | + 300, - 0 mm   |
| Module length, 12 m                          | + 150, - 0 mm   | + 150, - 0 mm   |
| Module length, greater than 12 m             | + 300, - 0 mm   | + 300, - 0 mm   |
| "New over old" line placement (lateral)      | -   | < 10 mm   |
| "New over old" line placement (longitudinal) | -   | + 150, - 0 mm   |

## No Overtaking Zones

- 5.43 The Contractor shall accurately locate the extent of no overtaking zones from the Drawings prior to the commencement of works. To locate zones the Contractor shall use a calibrated, precise vehicle mounted measuring device capable of measuring to 1 m accuracy. If any discrepancies are identified the Contractor shall provide immediate notification. Under no circumstances shall the Contractor install new or modify existing installations.

## Removal of Pavement Markings (PCCP Class 27-1)

- 5.44 Removal of pavement marking shall be undertaken so as to not adversely affect the skid resistance, texture depth, susceptibility to ponding and appearance of the road surface. The Contractor shall obtain approval of the proposed removal method prior to undertaking the removal. Any materials produced by removal activity shall be immediately collected and removed from site and disposed of in an environmentally acceptable manner.

## Transition Between Existing and New Work

- 5.45 This sub-clause applies where a change of lane width after resealing works or road reconstruction results in a miss-match of an edge line. Where this occurs, the Contractor shall ensure that the edge lines transition smoothly between the old and new work. Unless specified otherwise, a transition treatment shall be made as indicated in Figure RD-LM-C1 5-1. The existing edge line and RRPMS shall be removed from the existing pavement and the new edge line shall transition between the old and new work on the existing pavement. The transitional line marking treatment shall not be applied to new pavement work.

Figure RD-LM-C1 5-1 Edge line Mismatch Treatment

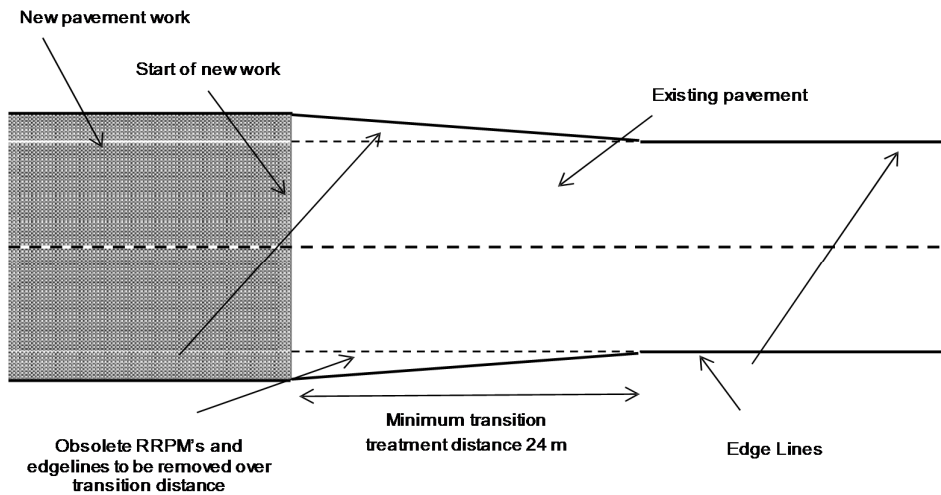


Figure 5.16  
Edge line Mismatch Treatment

## 6 Raised Pavement Markers (PCCP Class 25-1)

- 6.1 Installation of raised pavement markers shall be in accordance with the Department's Pavement Marking Manual if there are no drawings applicable. Markers shall be placed to a tolerance of  $\pm 25$  mm.
- 6.2 Adhesive shall be two-part epoxy or hot melt used in accordance with the manufacturer's instructions and applied evenly over the whole contact surface area of the marker so that a bead of adhesive forms around the perimeter when the marker is pressed onto the road surface during installation.
- 6.3 If removal of raised pavement markers is required, the Contractor shall remove the marker and adhesive in such a way that minimum damage is caused to the road surface. Any damage to a wearing surface shall be repaired by an approved method. Markers removed from the road shall be collected and disposed of.
- 6.4 Temporary RRPMs shall be sufficiently robust to survive the existing traffic conditions until permanent markings are installed.

## 7 Pavement Bars (PCCP Class 25-1)

- 7.1 Installation shall be carried out such that the pavement bars are placed true to the locations indicated on the Drawings. Bars shall be placed to a tolerance of  $\pm 25$  mm. Pavement bars shall be treated with a paint / bead application in one or more coats to achieve the specified paint and glass bead application rates.
- 7.2 Adhesive shall be two part epoxy or hot melt used in accordance with the manufacturer's instructions and applied evenly over the whole contact surface area of the bar so that a bead of adhesive forms around the perimeter when the bar is pressed onto the road surface during installation.
- 7.3 If removal of pavement bars is required, the Contractor shall remove the bar and adhesive in such a way that minimum damage is caused to the road surface. Remaining adhesive deposits shall be removed to surface level to give a textured surface finish. The bar shall be disposed of appropriately and any surface damage repaired. The method of repair shall be subject to prior approval.
- 7.4 If maintenance repainting of pavement bars is required, bars shall be treated with a paint/bead application to achieve the specified paint and glass bead application rates. Precautions shall be taken to avoid "overspray" and damage by traffic whilst drying.

## 8 Retroreflectivity

- 8.1 The measurement of retroreflectivity, as referenced in TP 950, shall be carried out using a low angle retroreflectometer using 30 metre geometry calibrated to a nationally recognised reference standard.
- 8.2 All reading shall be recorded.
- 8.3 The initial retro-reflectivity before the final coating is placed shall have a minimum of 90% of readings passing the value shown in Table RD-LM-C1 8-1 with no reading to be below the 160 day requirement.
- 8.4 Any test locations that fall below the value shown in Table RD-LM-C1 8-1, the affected area, as defined in TP 950, shall have the pavement marking re-applied.

**Table RD-LM-C1 8-1 Retroreflectivity**

| Retroreflectivity   |          |            |                          |
|---|----------|------------|--------------------------|
| Annual Average Daily Traffic Estimates (AADTE) >10 000 vehicles per day |          |            |                          |
| Days of Wear  | 10 to 20 | 160 to 180 | 360 to 380               |
| Retroreflectivity, mcd/m <sup>2</sup> /lx                               | 240      | 165        | No requirement specified |
| AADTE 4 000 to 10 000 vehicles per day                                  |          |            |                          |
| Days of Wear  | 10 to 20 | 160 to 180 | 360 to 380               |
| Retroreflectivity, mcd/m <sup>2</sup> /lx                               | 240      | 175        | No requirement specified |
| AADTE 1 000 to 4 000 vehicles per day                                   |          |            |                          |
| Days of Wear  | 10 to 20 | 160 to 180 | 360 to 380               |
| Retroreflectivity, mcd/m <sup>2</sup> /lx                               | 240      | 220        | No requirement specified |
| AADTE <1 000 vehicles per day   |          |            |                          |
| Days of Wear  | 10 to 20 | 160 to 180 | 360 to 380               |
| Retroreflectivity, mcd/m <sup>2</sup> /lx                               | 265      | 235        | 225                      |

- 8.5 Retroreflectivity testing of pavement markings shall be in accordance with AS 4049.4, Appendix K to demonstrate compliance with the Performance Standards in 6.1 – Retroreflectivity Performance Standards.
- 8.6 The Contractor shall:
- Mark test sites on the pavement to allow repeated testing;
  - Reference all test sites' GPS coordinates in WGS84 equivalent format; and
  - Forward a report to the Superintendent in tabular form on a monthly basis or as requested.
- 8.7 Frequency of testing shall be conducted at the same locations at the intervals in Table RD-LM-C1 Table 8-2 Pavement Marking Testing Intervals.

**Table RD-LM-C1 Table 8-2 Pavement Marking Testing Intervals**

| Pavement Marking Testing Intervals                      |                                 |
|---|---------------------------------|
| Longitudinal Pavement Marking Testing Intervals         |                                 |
| Length of Road (km)                                     | Minimum No. of Test Sites       |
| < 0.5   | 1                               |
| 0.5 - 5   | 2                               |
| 5 - 50  | Every 5km, minimum 2 test sites |
| > 50  | Every 10km                      |
| Transverse and other pavement Marking Testing Intervals |                                 |
| No. of Transverse and Other Markings                    | Minimum No. of Test Sites       |
| Sites with < 4* transverse markings                     | 2                               |
| Small Intersections (>12*)                              | 4                               |
| Large Intersections (>20*)                              | 6                               |

### Pavement Marking Testing Intervals

|  |                                 |
|--|---------------------------------|
| Give Way and Stop Bars                                 | 1 at each site                  |
| All other markings (turn lines, chevrons, arrows etc.) | 25% of overall No. of markings. |

Note: "<4", ">12\*" and ">20\*" refers to the number of transverse and other pavement markings existing at given intersection.

- 8.8 At each test site the Contractor shall take the following minimum number of measurements of longitudinal lines:
- a) 3 readings on all edge lines, outlines of lane lines taken in the viewing direction of road users; and
  - b) 6 readings on all dividing lines (3 readings in each direction);
- 8.9 Readings at each test site shall be a minimum of 1m apart. Both individual and averaged tests results shall be presented as part of the Contractor's test report.
- 8.10 At each test site the Contractor shall measure reflectorized transverse pavement marking as follows:
- a) 2 readings on each reflectorized transverse pavement marking taking in the viewing direction of road users.
- 8.11 Readings at each test site shall be a minimum of 1m apart. Both individual and averaged test results shall be presented as part of the Contractor's test report.

## 9 Skid Resistance

- 9.1 Skid resistance for transverse marking shall be greater than 45 BPN, until at least the issue of the Final Certificate, when measured in accordance with TP344 or TP345. If the skid resistance is below 45 BPN the Contractor shall re-apply pavement marking to the affected area.

## 10 Test Procedures

- 10.1 The Contractor shall use the following test procedures (refer [https://www.dpti.sa.gov.au/contractor\\_documents](https://www.dpti.sa.gov.au/contractor_documents)) to verify conformance with the Specification:

**Table RD-LM-C1 10-1 Test Procedures**

| Test  | Test Procedure |
|---|----------------|
| Determination of Skid Resistance with the Grip Tester   | TP344          |
| Operation of a British Pendulum Portable Skid Tester    | TP345          |
| Determination of Retroreflectivity of Pavement Markings | TP907          |
| Audit: Line Marking Product                             | TP950          |

## 11 Hold Points

- 11.1 The following is a summary of Hold Points referenced in this Part:

**Table 11-1 Hold Points**

| Document Ref. | Hold Point  | Response Time  |
|---------------|---|----------------|
| 2.3           | Submission of Quality Management Plan                                 | 7 Working Days |
| 5.3           | Following spotting and prior to application of pavement marking paint | 1 Working Day  |

## 12 Verification Requirements and Records

### Test Records

12.1 The Contractor shall undertake the testing specified in this Clause and supply written evidence of compliance with the lot package.

**Table RD-LM-C1 12-1 Verification Requirements**

| Document Ref. | Subject                           | Property   | Procedure   | Frequency                  | Acceptance Limits                                |
|---------------|-----------------------------------|--|---|----------------------------|--|
| 5.1           | Application conditions            | Measurement of temperature and relative humidity | Contractor to provide   | Every work session.        | Air temperature > 10°C. Relative humidity < 85%. |
| 5.13          | All pavement marking applications | Material application rate                        | Contractor to provide evidence through materials consumption and area | Every work session.        | As per Table RD-LM-C1 5-4                        |
| 8             | Retroreflectivity                 | Retroreflectivity                                | TP907 & TP950 Contractor to provide results                           | Every work session & TP950 | As per Table RD-LM-C1 8-1                        |
| 9             | Skid Resistance                   | Skid Resistance                                  | TP244 or TP345  | As requested               | As per Clause 9                                  |

### Other Records

12.2 The Contractor shall supply the following records:

**Table RD-LM-C1 12-2 Verification records**

| Document Ref. | Subject          | Record To Be Provided                             |
|---------------|------------------|---|
| 5.4           | Regulatory lines | Time and date of installation of regulatory lines |
| Part RD-LM-S1 | Materials        | Records referred to in Clause RD-LM-S1.13         |

## 13 Measurement

13.1 A line pattern will be measured as though it is a continuous line (i.e. the measurement will be the sum of the painted and unpainted dimensions).

13.2 A Barrier Line will be measured as though it is a single line.

13.3 Pavement marking which involves a 2-coat paint system will be measured as though it is a single coat (i.e. the quantity shown in any schedule is the actual measurement of the marking on the pavement surface).