

**Specification (Measurement)**

**Transport and Main Roads Specifications  
MRS10 Plant-Mixed Lightly Bound Pavements**

**July 2021**

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## 1 Introduction

This Specification applies to the construction of road pavements using plant-mixed lightly bound pavement layers. This Specification relates to lightly bound pavement materials with an unconfined compressive strength (UCS) of 1.0 to 2.0 MPa for base courses, subbase courses and improved layers.

This Specification shall be read in conjunction with MRS01 *Introduction to Specifications* and other Specifications as appropriate.

This Specification forms part of the Transport and Main Roads Specifications Manual.

## 2 Measurement of work

### 2.1 Standard Work Items

In accordance with the provisions of Clause 2 of MRS01 *Introduction to Specifications*, the Standard Work Items covered by this Specification are listed in Table 2.1.

**Table 2.1 – Standard Work Items**

Standard Item No.	Description	Unit of Measurement
40601	Plant-mixed Lightly Bound Base, [ <i>location</i> ]	m <sup>3</sup>
40602	Plant-mixed Lightly Bound Improved Layer, [ <i>location</i> ]	m <sup>3</sup>
40603	Plant-mixed Lightly Bound Subbase, [ <i>location</i> ]	m <sup>3</sup>

### 2.2 Work Operations

**Item 40601 Plant-mixed Lightly Bound Base, [*location*]**

**Item 40602 Plant-mixed Lightly Bound Improved Layer, [*location*]**

**Item 40603 Plant-mixed Lightly Bound Subbase, [*location*]**

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) undertaking mix designs, including all required sampling, testing and reporting in accordance with the relevant Technical Specifications
- c) nomination of stabilising agent type and target content
- d) nomination of unbound pavement material (where applicable)
- e) supply, transport and delivery of all materials including the stabilising agent(s)
- f) stockpiling, storing, metering and mixing of all components of the mixture to produce a uniform material
- g) delivering, placing, compacting and, if necessary, trimming of the stabilised material
- h) preparation of joints, including removal and disposal of cutback material
- i) preparation of surfaces, including slurring between layers and removal and disposal of cutback material as required

- j) supply, transport and delivery of water and equipment for curing and application of the water to maintain the relevant layers in a damp condition at all times during the curing period
- k) sampling and compliance testing to demonstrate conformance with the relevant Technical Specifications, and
- l) maintenance of the subgrade and/or pavement courses.

Where the use of Intelligent Construction (IC) Rollers is specified in Annexure MRTS10.1, the Contractor shall allow for these costs as part of the relevant lightly bound pavement payment item.

### 3 Utilisation of a rejected lot for a reduced level of service

#### 3.1 General

Pre-determined acceptance criteria in the form of payment reductions, as provided in this Specification, may be applied to nonconformances for the properties given in Table 3.1.

**Table 3.1 – Properties and limits for acceptance at a reduced level of service**

Property	Limit for Acceptance at Reduced Level of Service
Unbound pavement material	Refer MRS05 <i>Unbound Pavements</i>
Compaction Standard	2% below the specified limit
Stabilising Agent Content	0.2% above or below the respective upper or lower specification limit
Road Roughness (Surface Evenness)	0.7 m/km above the specified limit
Intelligent Construction (IC) Roller Coverage	N/A

For unbound pavement material, compaction standard, stabilising agent content and IC roller coverage nonconformances, the payment reduction (%) shall apply to the scheduled rate for the entire lot of lightly bound pavement material represented by the tests, for the total thickness of that layer.

For road roughness nonconformances, the payment reduction (%) shall apply to the scheduled rate for the quantity of the lightly bound pavement material represented by:

- a) the area of the lot represented by the road roughness test results, and
- b) the depth of material which is the lesser of:
  - i. the full depth of the lightly bound pavement base course, or
  - ii. 200 mm.

Where a nonconformance is accepted for more than one of these properties, the total payment reduction (%) to be applied to the scheduled rate shall be determined by adding together the individual payment reduction (%) calculated for each property in accordance with Clauses 3.2.

Unless otherwise approved by the Administrator, a lot shall not be utilised for a reduced level of service if:

- a) the actual value of any property or requirement not listed in Table 3.1 has failed to meet the specified limit or requirement

- b) the actual value for any property listed in Table 3.1 has exceeded the limit stated in Table 3.1
- c) the actual value for any property given in Table 3.1 has exceeded the specified limit (not the limit stated in Table 3.1) for the same property in the immediately preceding lot, or
- d) the actual value for any property given in Table 3.1 has exceeded the specified limit (not the limit states in Table 3.1) for the same property in more than three lots of any preceding work.

The pre-determined acceptance criteria setout in this Specification form the basis for lots to be accepted at a reduced level of service.

Where nonconformance fall outside of the limits nominated, the defective works shall be assessed in accordance with the requirements of the Contract. Where appropriate, the Administrator may agree to accept lots outside of the limits nominated. In doing so, the reduction in value shall be determined by the Administrator in accordance with the requirements of Clause 3 of MRS50 *Specific Quality System Requirements*.

### **3.2 Determination of the reduced value**

#### **3.2.1 Unbound pavement material**

Refer to MRS05 *Unbound Pavements*.

#### **3.2.2 Compaction standard**

The following payment reduction (%) will be applied to accepted nonconformances in compaction standard.

$$\text{Payment reduction (\%)} = (C_s - C_a) \times 4$$

where:

$C_a$  = the actual minimum characteristic value of compaction, and

$C_s$  = the specified value of compaction (refer Clause 8.3.4 of MRTS10)

#### **3.2.3 Stabilising agent content**

The payment reduction (%) stated in Table 3.2.3 will be applied to accepted nonconformances in stabilising agent content.

**Table 3.2.3 – Reduction in value for stabilising agent content nonconformances**

Absolute Value of ( $S_t - S_a$ ) #	Reduction in Value
0.1%	10%
0.2%	20%
$\geq 0.3\%$	Reduced level of service does not apply

Note

# where:

$S_a$  = the actual minimum or maximum characteristic value of stabilising agent content as a percentage (refer Clause 9.4.5 of MRTS10)

$S_t$  = the minimum or maximum target content of stabilising agent content as a percentage (refer Clause 8.3.2 of MRTS10)

If the actual minimum characteristic value of stabilising agent content ( $S_a$ ) is nonconforming the deduction shall be determined based on the minimum value of the target content of stabilising agent ( $S_t$ ).

If the actual maximum characteristic value of stabilising agent content ( $S_a$ ) is nonconforming the deduction shall be determined based on the maximum value of the target content of stabilising agent ( $S_t$ ).

Where both the minimum and maximum characteristic values are nonconforming, the lot shall not be used at a reduced level of service unless accepted by the Administrator.

### 3.2.4 Road roughness (surface evenness)

The following payment reduction (%) will be applied to accepted nonconformances in road roughness.

$$\text{Payment reduction (\%)} = 26.49 \times (R_a - R_s)$$

where:

$R_a$  = the actual road roughness value, and

$R_s$  = the specified road roughness value (refer Clause 8.3.7 of MRTS10)

Calculation of surface roughness should accurately represent the ride quality of the complete pavement. It is generally accepted that the inclusion of other road features within the pavement are likely to reduce ride quality.

In accordance with the test method adopted, these features are required to be noted during roughness testing. However, in accordance with Clause 9.4.12 of MRTS10, the following features are allowed to be excluded from the ride quality assessment:

- roundabouts
- railway lines
- bridge joints, and
- inspection pit covers (for example, drainage manholes).

The Contractor should nominate a methodology and provide calculations on ride quality for the Administrators acceptance, showing how each feature has been excluded from the assessment and the subsequent lot structure.

Under no circumstances should pavement features (including joints) or signalised / unsignalised intersections (other than roundabouts) be excluded from the ride quality assessment without the express agreement of the Administrator.

### 3.2.5 Intelligent Construction (IC) Roller Coverage

The payment reduction for nonconformances in IC roller coverage shall be in accordance with Table 3.2.5.

**Table 3.2.5 – Payment Reduction for Nonconformances in IC Roller Coverage**

Coverage	Payment Reduction
80% – 89%	5%
70% – 89%	10%
< 70%	20%

## 4 Additional payment for a higher standard of surface evenness

### 4.1 General

Where specifically stated in Clause 1 of Annexure MRS10.1, an additional payment above the scheduled rate will be made if a higher standard of surface evenness is achieved when measured as a reduction in road roughness below the maximum specified limit.

### 4.2 Payment

The value of any additional payment will be determined as follows:

$$\text{Additional Payment (\$)} = R \times Q \times P$$

where:

R = scheduled rate for the Work Item for Plant-mixed Lightly Bound Base

Q = compacted quantity of pavement material in the lot that is eligible for payment (refer Clause 4.3), and

P = the additional payment factor for a higher standard of surface evenness, calculated as:

$$P = \left( \frac{R_s - R_a}{9.4} \right) - 0.02$$

where:

R<sub>a</sub> = the actual road roughness value, and

R<sub>s</sub> = the specified road roughness value (refer Clause 8.3.7 of MRTS10)

Notwithstanding the above requirements, the maximum value of P shall be 0.04.



#### **4.3 Quantity of pavement to which the additional payment applies**

Any additional payment will apply to the quantity of the lightly bound pavement material represented by:

- a) the area of the lot represented by the road roughness test results, and
- b) the depth of material which is the lesser of:
  - i. the full depth of the lightly bound pavement base course, or
  - ii. 150 mm.

Additional payment shall only apply where all construction compliance test results are conforming in accordance with the requirements of Clause 9 of MRTS10.

