

# Main Roads Specification

**MRS08**

## **Plant-Mixed Stabilised Pavements using Cement**

SUPERSEDED

**June 09**

## **IMPORTANT INFORMATION**

The requirements of this document represent Technical Policy of the department and contain Technical Standards. Compliance with the department's Technical Standards is mandatory for all applications for the design, construction, maintenance and operation of road transport infrastructure in Queensland by or on behalf of the State of Queensland.

This document will be reviewed from time to time as the need arises and in response to improvement suggestions by users. Please send your comments and suggestions to the feedback email given below.

## **FEEDBACK**

Your feedback is welcomed. Please send to [mr.techdocs@tmr.qld.gov.au](mailto:mr.techdocs@tmr.qld.gov.au).

## **COPYRIGHT**

© State of Queensland (Department of Transport and Main Roads) 2009

Copyright protects this publication. Except for the purposes permitted by and subject to the conditions prescribed under the Copyright Act, reproduction by any means (including electronic, mechanical, photocopying, microcopying or otherwise) is prohibited without the prior written permission of the department. Enquiries regarding such permission should be directed to the Road & Delivery Performance Division, Queensland Department of Transport and Main Roads.

## **DISCLAIMER**

This publication has been created for use in the design, construction, maintenance and operation of road transport infrastructure in Queensland by or on behalf of the State of Queensland.

Where the publication is used in other than the department's infrastructure projects, the State of Queensland and the department gives no warranties as to the completeness, accuracy or adequacy of the publication or any parts of it and accepts no responsibility or liability upon any basis whatever for anything contained in or omitted from the publication or for the consequences of the use or misuse of the publication or any parts of it.

If the publication or any part of it forms part of a written contract between the State of Queensland and a contractor, this disclaimer applies subject to the express terms of that contract.

**June 09**

## Table of Contents

	Page
1 INTRODUCTION.....	1
2 MEASUREMENT OF WORKS.....	1
2.1 Bituminous curing coat .....	1
2.2 Standard Work Items.....	1
2.2.1 Work Operations.....	1
2.3 Calculation of Quantities .....	2
2.3.1 Stabilising Agent .....	2
2.3.2 Admixture.....	2
2.3.3 Water curing.....	2
2.4 Allocation of Item Numbers .....	3
2.5 Utilisation of a Rejected Lot for a Reduced Level of Service .....	3
2.5.1 Maximum Reductions in Standards for a Reduced Level of Service .....	3
2.5.2 Pavement Material Defects.....	4
2.5.3 Determination of the Reduced Value.....	4
2.5.4 Application of the Reduced Value Payments .....	4
2.6 Additional Payment for a Higher Standard of Surface Evenness .....	4
2.6.1 General .....	4
2.6.2 Payment.....	5
2.6.3 Quantity of Pavement to Which the Additional Payment Applies .....	5

SUPERSEDED

SUPERSEDED

# Plant-Mixed Stabilised Pavements

## 1 INTRODUCTION

This Specification applies to the construction of stabilised layers in road pavements using a plant-mixed pavement material which comprises a mixture of unbound granular pavement material and a cement based stabilising agent. In addition it may contain admixtures.

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

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

## 2 MEASUREMENT OF WORKS

### 2.1 Bituminous curing coat

Bituminous curing coats shall be a sprayed bituminous surfacing with cover aggregate and shall comply with MRS11 *Sprayed Bituminous Surfacing (Excluding Emulsions)*, MRS12 *Sprayed Bitumen Emulsion Surfacing*, MRS20 *Cutback Bitumen*, MRS21 *Bituminous Emulsion*, MRS22 *Supply of Cover Aggregate* and other relevant Specifications.

Notwithstanding the above bituminous curing coats shall also comply with this Specification.

### 2.2 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 2.2.

**Table 2.2 – Standard Work Items**

Standard Item No.	Description	Unit of Measurement
	<b>Plant-Mixed Stabilised Pavements</b>	
4301	Plant-mixed stabilised pavement.	m <sup>3</sup>
4321	Supply of stabilising agent.	tonne
4331	Water curing.	m <sup>2</sup>

#### 2.2.1 Work Operations

##### Item 4301 Plant-mixed stabilised pavement.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and delivery of all materials excluding the stabilising agent and admixture (if required);
- c) Stockpiling, storing, metering and mixing of all components of the mixture to produce a uniform material;
- d) Delivery, placing, compaction and, if necessary, trimming of the stabilised material;
- e) Excavation, removal, disposal and replacement of segregated/cutback material;
- f) Preparation of joints and surfaces;
- g) Testing for visible deflection;
- h) Maintenance of the subgrade and/or pavement courses; and
- i) Supply, transport, delivery and storage of the admixture(s).

**Item 4321 Supply of stabilising agent.**

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*; and
- b) Supply, transport, delivery and storage of the stabilising agent.

**Item 4331 Water curing.**

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply, transport, delivery and storage of the water;
- c) Application of the water; and
- d) Maintaining the relevant layers in a damp condition at all times during the curing period.

**Items associated with the bituminous curing coat(s).**

Work Operations incorporated in the above item include –

- a) Work Operations listed in the relevant specification(s);
- b) Supply, transport, delivery and storage of the water for water curing, if required;
- c) Water curing if the bituminous curing coat is not placed immediately after compaction; and
- d) Maintaining the relevant layers in a continuously moist condition as required until the bituminous curing coat is constructed.

**2.3 Calculation of Quantities**

**2.3.1 Stabilising Agent**

The mass of stabilising agent shall be calculated using the following formula –

$$M = \frac{Q \times D \times C_o}{100}$$

where –

M = Mass of stabilising agent in tonnes;

Q = Quantity of plant mixed pavement material in m<sup>3</sup>;

D = Dry density of a representative sample of unbound granular material to be stabilised, compacted to 100% of standard compaction, in tonnes per m<sup>3</sup>; and

C<sub>o</sub> = Approved content of stabilising agent in percent.

The mass of stabilising agent for each lot shall be calculated using the above formula in conjunction with the dry density of the corresponding representative sample (compacted to 100% of standard compaction) for the lot.

The total mass of stabilising agent shall be the sum of the masses of stabilising agent calculated for each lot.

**2.3.2 Admixture**

The quantity of admixture shall be calculated using a method approved by the Superintendent.

The quantity of admixture for each lot shall be calculated for the corresponding mix design for the lot.

The total quantity of admixture shall be the sum of the quantities of admixture calculated for each lot.

**2.3.3 Water curing**

The area of water curing shall be calculated from the lengths and widths of the lots for which only water curing has been specified. No measurement for water curing shall be made for those lots for which curing with a sprayed bituminous surfacing with cover aggregate has been specified.

## 2.4 Allocation of Item Numbers

Specific Item Numbers used in the Schedule of Rates for this Contract shall be deemed to represent the work associated with the particular reference locations, and course locations where applicable, stated in Clauses 1, 2 and 3 of Annexure MRS08.1.

## 2.5 Utilisation of a Rejected Lot for a Reduced Level of Service

### 2.5.1 Maximum Reductions in Standards for a Reduced Level of Service

A lot shall not be utilised for a reduced level of service if –

- a) the actual value for any property or requirement not listed in the first column of Table 2.5.1-A has failed to meet the specified limit or requirement for such property or requirement;
- b) the actual value for any property or requirement listed in the first column of Table 2.5.1-A has deviated from the extended limit stated in the second column of Table 2.5.1-A;
- c) the actual value for any property given in Table 2.5.1-A or Table 2.5.1-B has deviated from the specified limit (not the extended limit) for the same property in the immediately preceding lot; or
- d) the actual value for any property given in Table 2.5.1-A or Table 2.5.1-B has deviated from the specified limit (not the extended limit) for that property in more than three lots for any preceding work.

**Table 2.5.1-A – Extended Limits**

Property	Extended Limit
Pavement material	Maximum of † a) 5 defects for any individual sample; or b) a lot average of 3 defects (refer to Clause 2.2.2).
Stabilising Agent Content	Minimum content no less than Ordered Content minus 0.5%
Characteristic Value of RDD	Minimum characteristic value of RDD no less than Specified RDD minus 2%
Road Roughness Count Rate	Maximum road roughness count rate of $R_m$ as stated in Clause 4 of Annexure MRS08.1 or, where $R_m$ is not so stated, $R_s + 20$ , where $R_s$ is defined in Clause 8.2.7.2.4 of MRTS08.

† A defect is as defined in Table 2.5.1-B.

**Table 2.5.1-B – Table of Defects**

Property	Magnitude of Incremental Departure Outside the Specified Limits or Values Which Accumulates One Defect
Percentage passing the AS 2.36 mm sieve and greater.	For each sieve size, each 2% absolute (or part thereof).
Percentage passing the AS 0.425 mm sieve and the AS 0.075 mm sieve.	For each sieve size, each 1% absolute (or part thereof).
Ratio of the percentage passing the AS 0.075 mm sieve to the percentage passing the AS 0.425 mm sieve.	Up to 0.05 increase or decrease. Each 0.02 (or part thereof) increase or decrease beyond the aforementioned 0.05 increase or decrease.
Liquid Limit.	Each 2% absolute (or part thereof) increase.
Plasticity Index.	Each 0.4% absolute (or part thereof) increase.
Linear Shrinkage.	Each 0.2% absolute (or part thereof) increase.
Plasticity Index multiplied by the percentage of whole sample passing the AS 0.425 mm sieve.	Each 5 units (or part thereof) increase.
Linear Shrinkage multiplied by the percentage of whole sample passing the AS 0.425 mm sieve.	Each 2.5 units (or part thereof) increase.

## 2.5.2 Pavement Material Defects

The average number of defects for each stockpile lot shall be determined by calculating the defects, if any, for each and every sample taken from the lot and dividing the total number of defects for the lot by the number of samples. The number of defects for each sample shall be determined from Table 2.5.1-B.

## 2.5.3 Determination of the Reduced Value

### 2.5.3.1 General

The reduced value shall be determined from the formula given below for the relevant property. Where there is more than one reduction, the percentage reductions for each property shall be added together to provide a total percentage reduction which shall apply to the scheduled rate.

### 2.5.3.2 Pavement Material

The percentage reduction shall be determined from the following formula –

$$\text{Percentage Reduction} = N_{av} \times 3$$

where –

$N_{av}$  = the average number of defects determined in accordance with Clause 2.5.2.

### 2.5.3.3 Compaction Standard

The percentage reduction shall be determined from the following formula –

$$\text{Percentage Reduction} = (C_s - C_a) \times 4$$

where –

$C_a$  = the actual characteristic value of compaction; and

$C_s$  = the specified value of compaction.

### 2.5.3.4 Surface Evenness

The percentage reduction shall be determined from the following formula –

$$\text{Percentage Reduction} = R_a - R_s$$

where –

$R_a$  = the actual road roughness count rate; and

$R_s$  = the specified road roughness count rate defined in Clause 8.2.7.2.4 of MRTS08.

### 2.5.3.5 Stabilising Agent Content

The percentage reduction shall be determined from the following formula –

$$\text{Percentage Reduction} = (S_o - S_a) \times 10$$

where –

$S_a$  = the actual stabilising agent content as a percentage calculated in accordance with Clause 9.2.5; and

$S_o$  = the ordered stabilising agent content as a percentage.

## 2.5.4 Application of the Reduced Value Payments

The reduced values shall apply to the lot represented by the tests for the total thickness of the (individual) stabilised layer.

## 2.6 Additional Payment for a Higher Standard of Surface Evenness

### 2.6.1 General

If indicated in Clause 5 of Annexure MRS08.1, an additional payment above the scheduled rate, shall be made for the additional benefit of a higher standard of surface evenness on the surface on the final pavement layer as represented by the road roughness count rate.



## 2.6.2 Payment

Any additional payment shall be determined from the formula –

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

where –

R = scheduled rate for the Work Item for the top stabilised layer;

Q = compacted quantity in the lot (as modified by Clause 2.6.3); and

P = the additional payment factor due to achieving a higher standard of surface evenness –

$$= \frac{0.4 \times (R_s - R_a - 5)}{100}$$

where –

R<sub>s</sub> = specified road roughness count rate defined in Clause 8.2.7.2.4 of MRTS08; and

R<sub>a</sub> = measured road roughness count rate.

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

## 2.6.3 Quantity of Pavement to Which the Additional Payment Applies

The additional pavement shall apply to the lot represented by the higher standard of surface evenness for the total thickness of the (individual) stabilised layer.

SUPERSEDED