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**Specification (Measurement)**

**Transport and Main Roads Specifications  
MRS05 Unbound Pavements**

**April 2011**

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## 1 Introduction

This Specification applies to the construction of road pavements using unbound material.

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
4101	Base, unbound pavement, Type 1, Subtype [subtype], [location].	m <sup>3</sup>
4102	Subbase, unbound pavement, Type 1, Subtype [subtype], [location].	m <sup>3</sup>
4105	Base, unbound pavement, Type 3, Subtype [subtype], [location].	m <sup>3</sup>
4106	Subbase, unbound pavement, Type 3, Subtype [subtype], [location].	m <sup>3</sup>
4107	Base, unbound pavement, Type 4, Subtype [subtype], [location].	m <sup>3</sup>
4108	Subbase, unbound pavement, Type 4, Subtype [subtype], [location].	m <sup>3</sup>
4151	Subtype 2.1 Unbound pavement, [layer location in pavement].	m <sup>3</sup>
4152	Subtype 2.2 Unbound pavement, [layer location in pavement].	m <sup>3</sup>
4153	Subtype 2.3 Unbound pavement, [layer location in pavement].	m <sup>3</sup>
4154	Subtype 2.4 Unbound pavement, [layer location in pavement].	m <sup>3</sup>
4155	Subtype 2.5 Unbound pavement, [layer location in pavement].	m <sup>3</sup>

### 2.2 Work Operations

Item 4101	Base, unbound pavement, Type 1, Subtype [subtype], [location]
Item 4102	Subbase, unbound pavement, Type 1, Subtype [subtype], [location]
Item 4105	Base, unbound pavement, Type 3, Subtype [subtype], [location]
Item 4106	Subbase, unbound pavement, Type 3, Subtype [subtype], [location]
Item 4107	Base, unbound pavement, Type 4, Subtype [subtype], [location]
Item 4108	Subbase, unbound pavement, Type 4, Subtype [subtype], [location]
Item 4151	Subtype 2.1 Unbound pavement, [layer location in pavement]
Item 4152	Subtype 2.2 Unbound pavement, [layer location in pavement]
Item 4153	Subtype 2.3 Unbound pavement, [layer location in pavement]
Item 4154	Subtype 2.4 Unbound pavement, [layer location in pavement]
Item 4155	Subtype 2.5 Unbound pavement, [layer location in pavement]

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) winning and processing of materials
- c) stockpiling
- d) supply and delivery of all material to the pavement
- e) spreading of material
- f) supply and incorporation of water
- g) compacting and trimming
- h) additional work to achieve higher tolerances
- i) maintenance of the subgrade and/or pavement courses, and
- j) compliance testing.

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

#### 3.1 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 of any property or requirement not listed in the first column of Table 3.1-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 3.1-A has deviated from the extended limit stated in the second column of Table 3.1-A;
- c) the actual value for any property given in Table 3.1-A or Table 3.1-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 3.1-A or Table 3.1-B has deviated from the specified limit (not the extended limit) for that property in more than three lots for any preceding work.

**Table 3.1-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 3.2)
Characteristic value of RDD	Minimum – Specified RDD – 2%
Road roughness count rate	Maximum – $R_m$ as stated in Clause 1 of Annexure MRS05.1 or, where $R_m$ is not so stated, $R_s + 20$ , where $R_s$ is defined in Clause 9.2.5.2.4 or MRTS05

† A defect is as defined in Table 3.1-B

**Table 3.1-B – Schedule for calculating defects in a lot**

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	a) Up to 0.05 increase or decrease b) Each 0.02 (or part thereof) increase or decrease beyond that in (a) above
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
Weighted Plasticity Index	Each 5 units (or part thereof) increase
Linear Shrinkage x percentage of whole sample passing the AS 0.425 mm sieve	Each 2.5 units (or part thereof) increase

### 3.2 Pavement material defects

The average number of defects for each lot will 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 will be determined from Table 3.1-B.

### 3.3 Determination of the reduced value

#### 3.3.1 General

The reduced value shall be determined in accordance with Clauses 3.3.2 to 3.3.4 inclusive. 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.

#### 3.3.2 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 3.2.

#### 3.3.3 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.

### 3.3.4 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 9.2.5.2.4 of MRTS05.

### 3.4 Application of the reduced value payments

The reduced values shall apply to the lot represented by the tests except that, in the case of the road roughness count rate, the reduced value shall apply to 150 mm of the base course, or the full depth of the base as shown in the Contract, whichever is the lesser.

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

### 4.1 General

If indicated in Clause 2 of Annexure MRS05.1, an additional payment above the scheduled rate will be made for the additional benefit of a higher standard of rideability on the surface of the final unbound pavement layer as represented by the road roughness count rate.

### 4.2 Payment

Any additional payment will be determined from the formula:

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

where:

$R$  = scheduled rate for the Work Item for the base course;

$Q$  = compacted quantity in the lot (as modified by Clause 4.3); and

$P$  = the additional payment factor due to rideability

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

where:

$R_s$  = specified road roughness count rate defined in Clause 9.2.5.2.4 of MRTS05; and

$R_a$  = measured road roughness count rate.

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 150 mm of the base course, or the full depth of the base course as shown in the Contract, whichever is the lesser.

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