Specification (Measurement)

Transport and Main Roads Specifications MRS05 Unbound Pavements

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Queensland
Government

Contents

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
40001	Type 1 (HSG) Base, unbound pavement, [*location*]	m³
40002	Subtype 2.1, Unbound pavement, [*layer / location*]	m³
40003	Subtype 2.2, Unbound pavement, [*layer / location*]	m³
40004	Subtype 2.3, Unbound pavement, [*layer / location*]	m³
40005	Subtype 2.4, Unbound pavement, [*layer / location*]	m³
40006	Subtype 2.5, Unbound pavement, [*layer / location*]	m³
40007	Type 3 Base, Subtype [*subtype*], Unbound pavement, [*location*]	m³
40008	Type 3 Subbase, Subtype [*subtype*], Unbound pavement, [*location*]	m³
40009	Type 4 Base, Subtype [*subtype*], Unbound pavement, [*location*]	m³
40010	Type 4 Subbase, Subtype [*subtype*], Unbound pavement, [*location*]	m³

2.2 Work Operations

Item 40001   **Type 1 (HSG) Base, unbound pavement, [*location*]**

Item 40002   **Subtype 2.1, Unbound pavement, [*layer / location*]**

Item 40003   **Subtype 2.2, Unbound pavement, [*layer / location*]**

Item 40004   **Subtype 2.3, Unbound pavement, [*layer / location*]**

Item 40005   **Subtype 2.4, Unbound pavement, [*layer / location*]**

Item 40006   **Subtype 2.5, Unbound pavement, [*layer / location*]**

Item 40007   **Type 3 Base, Subtype [*subtype*], Unbound pavement, [*location*]**

Item 40008   **Type 3 Subbase, Subtype [*subtype*], Unbound pavement, [*location*]**

Item 40009   **Type 4 Base, Subtype [*subtype*], Unbound pavement, [*location*]**

Item 40010   Type 4 Subbase, Subtype [*subtype*], Unbound pavement, [*location*]

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, transport and delivery of all material

   e) spreading and placement of material

   f) supply and incorporation of water

   g) compacting and trimming

   h) preparation of joints, including removal and disposal of cutback material

   i) preparation of surfaces

   j) additional work to achieve higher tolerances

   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 MRTS05.1, the Contractor shall allow for these costs as part of the relevant unbound 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 a Reduced Level of Service
Unbound Pavement Material	Maximum of – a) 5 defects for any individual sample, or b) an average of 3 defects in one lot. (Refer to Clause 3.2.1 for determination of number of defects)
Compaction Standard	2% below the specified 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 and IC roller coverage nonconformances, the payment reduction (%) shall apply to the scheduled rate for the entire lot of unbound pavement material represented by the tests, for the total thickness of the 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 unbound pavement base course, or

ii. 150 mm.

Where nonconformances are 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 set out 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

The following payment reduction (%) will be applied to accepted nonconformances in unbound pavement material.

$$\text{Payment reduction (\%)} = N_{av} \times 3$$

where:

N_{av} =   the average number of defects in one lot.

The average number of defects in one lot shall be determined by calculating the total number of individual 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 individual defects for each sample shall be calculated in accordance with Table 3.2.1.

Table 3.2.1 – Determination of defect in unbound pavement materials

Property	Magnitude of Incremental Departure Outside the Specified Limits which is Considered as 'One Defect'
Percentage passing: • AS 2.36 mm sieve and greater	For each sieve size - each 2% (absolute, or part thereof)
Percentage passing: • AS 0.425 mm sieve • AS 0.075 mm sieve	For each sieve size - each 1% (absolute, or part thereof)
Fines ratio	Up to 0.05 increase or decrease Each 0.02 (or part thereof) increase or decrease beyond that in 'a)' above
Liquid limit	Each 2% absolute (or part thereof) increase
Linear shrinkage	Each 0.2% absolute (or part thereof) increase
Weighted linear shrinkage	Each 2.5 units (or part thereof) increase

3.2.2 Compaction standard

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

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 8.4.3 or MRTS05).

3.2.3 Road roughness (surface evenness)

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

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 8.4.6 of MRTS05).

> 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 9.4.9 of MRTS05 *Unbound Pavements*, 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.

3.2.4 Intelligent Construction (IC) Roller Coverage

The payment reduction for nonconformances in IC roller coverage shall be in accordance with Table 3.2.4.

Table 3.2.4 – 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 MRS05.1, 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:

Additional payment ($) = R x Q x P

where:

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

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

$$P = \left(\frac{Rs - Ra}{9.4}\right) - 0.02$$

where:

R_a = the actual road roughness value, and

R_s = the specified road roughness value (refer Clause 8.4.6 of MRTS05 *Unbound Pavements*).

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 unbound 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 unbound 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 MRTS05 *Unbound Pavements*.