Specification (Measurement)

Transport and Main Roads Specifications MRS07A Insitu Stabilised Subgrades using Quicklime or Hydrated Lime

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Contents

1 Introduction

This Specification applies to the stabilisation of materials insitu by the addition of quicklime (hydrated and added as a slurry) or hydrated lime.

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 works

2.1 Standard Work Items

In accordance with the provisions of Clause 2.1.5 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
Insitu Stabilised Pavements using Quicklime or Hydrated Lime		
4235P	Excavation and disposal of overlying material, [*type of material*] (Provisional Quantity).	m^3
4236P	Excavation and disposal of material not suitable for stabilisation [*type of new material*] (Provisional Quantity).	m^3
4238P	New material to replace material not suitable for stabilisation [*type of new material*], if ordered (Provisional Quantity).	m^3
4246	Insitu stabilisation using Quicklime or Hydrated Lime [*Location*].	m^2
4256	Supply of stabilising agent [*description; Location*].	tonne
4266	Water curing [*location*]	m^2

2.2 Work Operations

Item 4235P Excavation and disposal of overlying material, [*type of material*] (Provisional Quantity).

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) excavating, loading and hauling of overlying material, and

c) disposal of material.

Item 4236P Excavation and disposal of material not suitable for stabilisation, [*type of material*] (Provisional Quantity).

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) excavating, loading and hauling of material not suitable for stabilisation, and

c) disposal of material.

Item 4238P New material to replace material not suitable for stabilisation [*type of new material*], if ordered (Provisional Quantity).

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

c) spreading the materials

d) compacting and trimming the materials to facilitate insitu stabilisation and work operations related to it

e) maintenance of the subgrade, and

f) material and construction compliance testing.

Item 4246 Insitu stabilisation using quicklime or hydrated lime.

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) compaction and trimming prior to spreading of the stabilising agent for each pass, if required

c) uniform spreading of the stabilising agent for each pass

d) incorporation of the stabilising agent into the material for each pass

e) light compaction of material between each pass

f) mixing, including the incorporation of water

g) compaction

h) trimming

i) supply, delivery and storage of water

j) application of water to maintain the stabilised layer in a damp condition at all times during the curing period

k) disposal of excess and trimmed material, and

l) associated material and construction compliance testing.

Item 4256 Supply of stabilising agent [*description*].

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) supply, delivery and storage of the stabilising agent, and

c) associated material and construction compliance testing.

Item 4266 Water curing [*location*].

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) supply, delivery and storage of water

c) application of the water to maintain the stabilised layer in a damp condition at all times during the curing period, and

d) associated material and construction compliance testing.

2.3 Calculation of quantities

2.3.1 Stabilising agent

2.3.1.1 Hydrated lime

Where hydrated lime is used, the mass of stabilising agent shall be calculated using the following formula:

$$M = \frac{A \times S \times AL_X}{1,000 \times AL_Y}$$

where:

M = Mass of stabilising agent in tonnes

A = Surface area of subgrade to be insitu stabilised in m^2

SO = Ordered stabilising agent spread rate for hydrated lime, in kg/m^2

AL_X = Available lime index for quicklime used in the laboratory mix design testing (%), and

AL_Y = Available lime index for quicklime used in construction (%).

The mass of stabilising agent for each lot shall be calculated using the above formula. The Available Lime Index shall be determined for the stabilising agent used in both laboratory design and construction. Except where stated otherwise in Clause 8 of Annexure MRTS07A.1, an available lime index of 90% shall be assumed for laboratory mix design testing. The quantity of lime shown in the schedules is based on an Available Lime Index of 90%. The Contractor is to make allowance for variations. Payment for the supply of stabilising agent shall be based on an available lime index of 90%.

2.3.1.2 Quicklime

Where quicklime is used, the mass of stabilising agent shall be calculated using the following formula:

$$M = \frac{0.76 \times A \times S \times AL_X}{1,000 \times AL_Y}$$

where:

M = Mass of stabilising agent in tonnes

A = Surface area of subgrade to be insitu stabilised in m^2

SO = Ordered stabilising agent spread rate for quicklime, in kg/m^2

AL_X = Available lime index for quicklime used in the laboratory mix design testing (%), and

AL_Y = Available lime index for quicklime used in construction (%).

The mass of stabilising agent for each lot shall be calculated using the above formula. The Available Lime Index shall be determined for the stabilising agent used in both laboratory design and construction. Except where stated otherwise in Clause 8 of Annexure MRTS07A.1, an available lime

index of 90% shall be assumed for laboratory mix design testing. The quantity of lime shown in the schedules is based on an Available Lime Index of 90%. The Contractor is to make allowance for variations. Payment for the supply of stabilising agent shall be based on an available lime index of 90%.

2.3.2 Removal and disposal of overlying material

The volume of material shall be determined from the three-dimensional shape bounded by the prepared ground surface and the finished shapes and dimensions as shown on the drawings or otherwise nominated in the Contract.

2.3.3 Removal and disposal of material not suitable for stabilisation

The volume of material shall be calculated from the loose truck volume of material disposed of from the site. Before commencing this operation the measured volume of the haulage plant and the loading method shall be as approved by the Superintendent. The total volume of material removed and disposed of shall be agreed with the Superintendent each day.

2.4 Utilisation of a rejected lot for a reduced level of service

2.4.1 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 2.4.1 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 2.4.1 has deviated from the extended limit stated in the second column of Table 2.4.1

c) the actual value for any property given in Table 2.4.1 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 2.4.1 has deviated from the specified limit (not the extended limit) for that property in more than three lots for any preceding work period.

Table 2.4.1 – Extended limits

Property	Extended Limit
Stabilising agent spread rate	Minimum – specified spread rate minus 2 kg/m^2
Characteristic value of RDD	Minimum – specified RDD minus 3%

2.4.2 Determination of the reduced value

2.4.2.1 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 be applied to the scheduled rate for all Work Items covered by Clause 2.1 of this Specification.

2.4.2.2 Compaction standard

Where a product standard applies to compaction, the percentage reduction shall be determined from the following formula:

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.

2.4.2.3 Stabilising agent spread rate

The percentage reduction shall be determined from the following formula:

Percentage Reduction = $(S_O – S_a) \times 3$

where:

S_a = the actual stabilising agent spread rate as a percentage calculated in accordance with Clause 9.6 of MRTS07A, and

S_O = the ordered stabilising agent spread rate, in kg/m^2.

2.4.3 Application of the reduced value payments

The reduced values shall apply to the lot represented by the tests.