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Specification (Measurement)

**Transport and Main Roads Specifications
MRS12 Sprayed Bituminous Emulsion Surfacing**

June 2009

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1 Introduction

This Specification applies to the application of sprayed bituminous emulsion surfacing. The work covered includes primes, primerseals, seals, reseals and enrichments.

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 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
Sprayed Bituminous Emulsion Surfacing		
5201	Prime, grade [<i>grade</i>], spray rate [<i>spray rate</i>], [<i>including excluding</i>] supply of binder, [<i>location</i>].	litre
5202	Primerseal, grade [<i>grade</i>], spray rate [<i>spray rate</i>], [<i>including excluding</i>] supply of binder, [<i>location</i>].	litre
5203	Seal, grade [<i>grade</i>], spray rate [<i>spray rate</i>], [<i>including excluding</i>] supply of binder, [<i>location</i>].	litre
5204	Reseal, grade [<i>grade</i>], spray rate [<i>spray rate</i>], [<i>including excluding</i>] supply of binder, [<i>location</i>].	litre
5205	Enrichment, grade [<i>grade</i>], spray rate [<i>spray rate</i>], [<i>including excluding</i>] supply of binder, [<i>location</i>].	litre
5211	Spreading prime cover material [<i>material</i>], [<i>spread rate</i>], [<i>location</i>].	m ³
5212	Spreading cover aggregate [<i>size</i>], [<i>spread rate</i>], [<i>location</i>].	m ³
5221	Supply of bituminous emulsion [<i>material</i>], [<i>class / grade</i>].	litre
5231	Transport of bituminous emulsion supplied by the Principal [<i>material</i>], from [<i>supply location</i>].	litre
5232	Transport of aggregate supplied by the Principal [<i>material</i>], from [<i>supply location</i>].	m ³
5241	Sprayed bituminous emulsion surfacing, [<i>including excluding</i>] supply of binder, [<i>including excluding</i>] supply of cover aggregates, [<i>location</i>], refer to Clause 1 of Annexure MRS12.1.	m ²

2.2 Work Operations

Item 5201 Prime, grade [*grade*], spray rate [*spray rate*], [*including | excluding*] supply of binder, [*location*].

Item 5202 Primerseal, grade [*grade*], spray rate [*spray rate*], [*including | excluding*] supply of binder, [*location*].

Item 5203 Seal grade [*grade*], spray rate [*spray rate*], [*including | excluding*] supply of binder, [*location*].

Item 5204 **Reseal grade [grade], spray rate [spray rate], [including / excluding] supply of binder, [location].**

Item 5205 **Enrichment, grade [grade], spray rate [spray rate], [including / excluding] supply of binder, [location].**

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) preparation of the surface prior to spraying
- c) supply of binder, where stated
- d) loading materials into the sprayer
- e) incorporating, mixing and heating materials, as relevant
- f) spraying
- g) unloading materials from the sprayer, if necessary, and
- h) cleaning roadside items, if necessary.

Item 5211 **Spreading prime cover material.**

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) loading, hauling, spreading, drag brooming and rolling of material, and
- c) removal and disposal of excess material.

Item 5212 **Spreading cover aggregate.**

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) loading, hauling, spreading, drag brooming and rolling of material, and
- c) removal and disposal of excess material.

Item 5221 **Supply of bituminous emulsion.**

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of material
- c) transport and storage of material, and
- d) removal of excess material from the Site.

Item 5231 **Transport of bituminous emulsion supplied by the Principal [material], from [supply location].**

Item 5232 **Transport of aggregate supplied by the Principal [material], from [supply location].**

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) transport of material from the point of supply by the Principal to the Site as set out in the Principal Supplied Material List (Form C6827), and
- c) storage of material.

Item 5241 Sprayed bituminous emulsion surfacing, [*including / excluding*] supply of binder, [*including / excluding*] supply of cover aggregates, [*location*], refer to Clause 1 of Annexure MRS12.1.

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of all material, including binder, additives, prime cover material and cover aggregates, other than that supplied by the Principal as stated on Form C6827
- c) transport and storage of material
- d) preparation prior to spraying
- e) loading the relevant materials into the sprayer
- f) incorporating, mixing and heating materials, as relevant
- g) spraying
- h) unloading materials from the sprayer, if necessary
- i) cleaning roadside items, if necessary
- j) loading, hauling, spreading of prime cover material and cover aggregate
- k) drag brooming and rolling of cover aggregate
- l) removal and disposal of excess prime cover material and cover aggregate, and
- m) removal of excess material from the Site.

2.2.1 Methods of quantifying sprayed bituminous emulsion surfacing

2.2.1.1 General

Two methods are used for quantifying the work associated with sprayed bituminous emulsion surfacing. They are:

- a) by measuring the quantities of materials used in the surfacing operation, and
- b) by measuring the required area of surfacing.

2.2.1.2 Quantifying by materials used

This method provides for the separate measurement of a spraying operation and a spreading operation.

The spraying operation shall be measured by Work Items 5201 (prime), 5202 (primerseal), 5203 (seal), 5204 (reseal) and 5205 (enrichment) which can either include or exclude the supply of binder. The following shall apply to quantifying the spraying operation:

- a) where the supply of binder is included, the Work Item shall be deemed to include all binder materials, and

- b) where the supply of binder and/or additives is excluded, bituminous material can be supplied by either the Principal or the Contractor. Material to be supplied by the Principal will be as listed on the Principal Supplied Material List (Form C6827). Any material not listed on the Principal Supplied Material List shall be supplied by the Contractor. Additional Work Items shall apply as follows
- i. where bituminous emulsion materials are to be supplied by the Contractor, Work Item 5221 shall be provided for each grade of bituminous emulsion material so supplied, and
 - ii. where bituminous emulsion materials are to be supplied by the Principal, Work Item 5231 shall be provided for transport from the point of supply of each grade of bituminous emulsion material so supplied.

The spreading operation shall be measured by Work Items 5221 (prime cover material) and 5212 (cover aggregate) which are for spreading of material only. Materials can be supplied by either the Principal or the Contractor. Material to be supplied by the Principal will be as listed on the Principal Supplied Material List (Form C6827). Any material not listed on the Principal Supplied Material List shall be supplied by the Contractor.

Where aggregate materials are to be supplied by the Contractor, the Work Items included in MRS22 *Supply of Cover Aggregates* shall apply.

Where aggregate materials are to be supplied by the Principal, Work Item 5232 shall be provided for transport from the point of supply of each type of aggregate material so supplied.

2.2.1.3 Quantifying by area

This method provides for the measurement of the complete surfacing operation by the area of surface required to be covered. In this case, only Work Item 5241 shall be provided in the Schedule of Rates and it shall be deemed to include the supply and installation of all materials in accordance with this Specification (including bituminous emulsion, prime cover material and cover aggregates).

The details of the surfacing treatment represented by Work Item 5241 shall be as stated in Clause 1 of Annexure MRS12.1.

Where material is to be supplied by the Principal, it will be listed on the Principal Supplied Material List (Form C6827) and Work Item 5231 or 5232 shall be provided for transport from the point of supply of each type of material so supplied. Any material not listed on the Principal Supplied Material List shall be supplied by the Contractor.

2.2.2 Calculation of quantities

2.2.2.1 Prime, primerseal, seal, reseal and enrichment

The quantities of prime, primerseal, seal, reseal, enrichment, at 15°C, shall be determined from the tally of actual quantities of bituminous material sprayed on each spray run, or the quantity calculated from the Designed Spray Rate, whichever is the lesser.

2.2.2.2 Spreading prime cover material and cover aggregate

The quantity of prime cover material and/or cover aggregate spread shall be determined from the tally of quantities of material used on each spray run or the quantity calculated from the Designed Spread Rate, whichever is the lesser.

2.2.2.3 Supply of bituminous emulsion

The quantity of bituminous emulsion measured as residual bitumen, shall be determined at 15°C, from the tally of actual quantities of bituminous emulsion sprayed on each spray run, or the quantity calculated from the Designed Spray Rate, whichever is the lesser.

2.2.2.4 Transport of material supplied by the principal

The quantity for transport of bituminous emulsion supplied by the Principal will be the actual quantity of bituminous emulsion, at 15°C, released to the Contractor at the point of supply.

The quantity for transport of prime cover material and/or cover aggregates supplied by the Principal will be determined from the tally of quantities of material used on each spray run or the quantity calculated from the Designed Spread Rate, whichever is the lesser.

2.2.2.5 Sprayed bituminous emulsion surfacing by area

The quantity of sprayed bituminous emulsion surfacing when specified by area shall be calculated from the actual plan dimensions shown on the Drawings.

2.3 Principal's materials

2.3.1 Return of excess Principal's materials and/or containers

Those Principal's materials and/or containers listed as returnable in the Principal Supplied Material List, Form C6827, and which are not used in the Works shall be returned to the Principal at the point of return given in the Principal Supplied Material List.

Payment for the return of excess materials and/or containers shall be at the rate for Transport of Materials (Item 5231), or if not appropriate, then as agreed to by the Superintendent and the Contractor. If an agreement cannot be reached, the Superintendent shall determine a rate based on quotations from a third party for work of a similar nature.

2.3.2 Takeover of excess Principal's bituminous emulsion (excluding modified bituminous emulsion)

Those Principal's materials listed in the Principal Supplied Material List, Form C6827 as materials to be taken over by the Contractor and which are not used in the Works shall be taken over by the Contractor. This Clause does not include prime cover material or cover aggregate.

The takeover value shall be calculated from the quantity of excess material and the purchase unit rate paid by the Principal. The purchase price shall not include any transport and overhead charges.

The takeover value of excess material shall be deducted from the payments made to the Contractor. The deductions shall not affect any other entitlements to the Contractor under this Contract, such as cost adjustment for rise and fall in material costs.

2.3.3 Additional Principal's materials used to rectify a rejected lot

Where a lot has been rejected and the Contractor has to use additional Principal's materials to carry out additional work and/or replace part or all of the lot, the cost of the additional Principal's materials shall be deducted from the payment made to the Contractor.

Where a lot has been rejected but subsequently accepted, the cost of any Principal's materials used on that lot during the original operations and in excess of the limits given in this Specification, shall be deducted from the payment made to the Contractor.

Neither of the above applies to a lot utilised for a reduced level of service.

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

2.4.1 Maximum reductions in standards

A lot which has an Actual Spray Rate outside $\pm 10\%$ of the Designed Spray Rate shall not be accepted for a reduced level of service.

A lot which has an amount of cover aggregate spread outside $- 5\%$ or $+ 10\%$ of the Designed Spread Rate shall not be accepted for a reduced level of service.

The maximum reduction in standards for bituminous emulsion shall be as specified in the Specification for supply of bitumen emulsion.

2.4.2 Determination of the reduced value

2.4.2.1 Bituminous emulsion

The percentage reduction in value for defects of delivered bituminous emulsion shall be equal to the number of defects determined from Clause 8.4 of MRTS21 *Bituminous Emulsion*. This percentage reduction shall be applied to the rate for prime, primerseal, seal, reseal or enrichment as applicable.

2.4.2.2 Surfacing

The percentage reductions in value shall apply only to the schedule rate for prime, seal, and reseal, or spreading cover aggregate, as relevant.

The percentage reductions in value shall be as stated in Tables 2.4.2.2-A and 2.4.2.2-B. The percentage differences in spray rates and spread rates shall be rounded to the nearest whole number.

Table 2.4.2.2-A – Reduction in value, spray rate

% Difference from Designed Spray Rate	% Reduction in Value
± 6	4
± 7	8
± 8	12
± 9	16
± 10	20

Table 2.4.2.2-B – Reduction in value, aggregate spread rate

% Difference		% Reduction in Value
Less Than	Greater Than	
- 1	+ 6	2
- 2	+ 7	4
- 3	+ 8	6
- 4	+ 9	8
- 5	+ 10	10

Note: The percentage difference relates to the amount of material spread calculated from the Design Spread Rate as:

$$\text{Amount Spread} = \frac{1}{\text{Spread Rate}}$$

2.5 Multiple reduction

Where more than one reduction applies, the percentage reductions shall be added.

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