

Superseded

**Specification (Measurement)**

**Transport and Main Roads Specifications  
MRS11 Sprayed Bituminous Treatments (Excluding  
Emulsion)**

**November 2023**



## Copyright

© The State of Queensland (Department of Transport and Main Roads) 2023.

## Licence



This work is licensed by the State of Queensland (Department of Transport and Main Roads) under a Creative Commons Attribution (CC BY) 4.0 International licence.

## CC BY licence summary statement

In essence, you are free to copy, communicate and adapt this work, as long as you attribute the work to the State of Queensland (Department of Transport and Main Roads). To view a copy of this licence, visit: <https://creativecommons.org/licenses/by/4.0/>

## Translating and interpreting assistance



The Queensland Government is committed to providing accessible services to Queenslanders from all cultural and linguistic backgrounds. If you have difficulty understanding this publication and need a translator, please call the Translating and Interpreting Service (TIS National) on 13 14 50 and ask them to telephone the Queensland Department of Transport and Main Roads on 13 74 68.

## Disclaimer

While every care has been taken in preparing this publication, the State of Queensland accepts no responsibility for decisions or actions taken as a result of any data, information, statement or advice, expressed or implied, contained within. To the best of our knowledge, the content was correct at the time of publishing.

## Feedback

Please send your feedback regarding this document to: [tmr.techdocs@tmr.qld.gov.au](mailto:tmr.techdocs@tmr.qld.gov.au)

**Contents**

- 1 Introduction ..... 1**
- 2 Measurement of work ..... 2**
  - 2.1 Standard Work Items ..... 2
  - 2.2 Work Operations ..... 2
  - 2.3 Methods of quantifying sprayed bituminous treatment ..... 4
    - 2.3.1 *General* ..... 4
    - 2.3.2 *Quantifying by materials used* ..... 4
    - 2.3.3 *Quantifying by area* ..... 5
    - 2.3.4 *Limits of accuracy for provisional quantities* ..... 6
  - 2.4 Calculation of quantities ..... 6
    - 2.4.1 *Spraying bituminous materials* ..... 6
    - 2.4.2 *Spreading prime cover material and cover aggregate* ..... 6
    - 2.4.3 *Cutter oil and adhesion agent* ..... 6
    - 2.4.4 *Transport of material supplied by the Principal* ..... 7
    - 2.4.5 *Sprayed bituminous surfacing treatment by area* ..... 7
  - 2.5 Supply of materials ..... 7
- 3 Utilisation of a rejected lot for a reduced level of service ..... 7**
  - 3.1 Maximum reductions in standards ..... 7
  - 3.2 Determination of the reduced value ..... 7
    - 3.2.1 *Bitumen* ..... 7
    - 3.2.2 *Polymer modified binder* ..... 8
    - 3.2.3 *Application* ..... 9
    - 3.2.4 *Multiple reductions* ..... 9
- 4 Principal supplied materials ..... 10**
  - 4.1 Additional Principal supplied materials used to rectify a rejected lot ..... 10

## 1 Introduction

This Specification applies to the application of sprayed bituminous treatments, but excludes the use of bituminous emulsions. It covers the treatment types listed in Table 1.

**Table 1 – Treatment types**

Treatment Type	Treatment Label
<b>Initial Treatments</b>	
Prime	P
Initial Single/Single Seal	I-S/S
Initial Double/Double Seal	I-D/D
<b>Secondary Treatments and Retreatments</b>	
Single/Single Seal	S/S
Double/Double Seal	D/D
High Stress Single/Single Seal for medium traffic loadings	HSS1-M
High Stress Single/Single Seal for heavy traffic loadings	HSS1-H
High Stress Double/Double Seal for medium traffic loadings	HSS2-M
High Stress Double/Double Seal for heavy traffic loadings	HSS2-H
Extreme Stress Double/Double Seal	XSS
Strain Alleviating Membrane for slow moving cracks	SAM-S
Strain Alleviating Membrane for rapid moving cracks	SAM-R
Strain Alleviating Membrane Interlayer	SAMI
Waterproofing Seal under asphalt <sup>1</sup>	WP-A
Geotextile Reinforced Seal with a Single/Single Seal	GRS-S/S
Geotextile Reinforced Seal with a Double/Double Seal	GRS-D/D
Surface Enrichment	SE
Scatter Coat	SC

### Note

<sup>1</sup> The WP-A treatment type is typically used to waterproof the underlying asphalt pavement when an open graded or stone mastic asphalt surfacing is used. It may also be used to waterproof pavements that contain a lightly bound base. For unbound pavements with an asphalt surfacing, a S/S treatment is typically used to waterproof the pavement prior to placement of an asphalt surfacing.

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
<b>Sprayed Bituminous Treatments (excluding Emulsion)</b>		
40721	Spraying bituminous material, treatment type [ <i>treatment type</i> ], binder [ <i>binder class</i> ], spray rate [ <i>spray rate</i> ], [ <i>location</i> ]	litre
40722	Spreading prime cover material, [ <i>spread rate</i> ], [ <i>including   excluding</i> ] supply of prime cover material, [ <i>location</i> ]	m <sup>3</sup>
40723	Spreading cover aggregate [ <i>size</i> ], [ <i>spread rate</i> ], [ <i>including   excluding</i> ] supply of cover aggregate, [ <i>location</i> ]	m <sup>3</sup>
40724	Sprayed bituminous treatment, type [ <i>treatment type</i> ], [ <i>including   excluding</i> ] supply of cover aggregates, [ <i>location</i> ], refer to Clause 2 of Annexure MRTS11.1	m <sup>2</sup>
40725P	Supply and addition of adhesion agent (Provisional Quantity)	litre
40729P	Supply and addition of cutter oil (Provisional Quantity)	litre

### 2.2 Work Operations

**Item 40721 Spraying bituminous material, treatment type [*treatment type*], binder [*binder class*], spray rate [*spray rate*], [*location*]**

Standard Work Item 40721 includes the supply of binder but does not included the supply and addition of additives (i.e. adhesion agent and cutter).

Standard Work Items 40725P and 40729P are used for the supply and addition of additives to the bituminous material.

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 binder
- c) transport, handling and storage of material
- d) associated material compliance testing
- e) preparation of the surface prior to spraying
- f) loading materials into the sprayer
- g) incorporating, mixing and heating materials, as necessary
- h) spraying
- i) unloading materials from the sprayer, if necessary

- j) cleaning roadside items, if necessary
- k) removal of excess material from the Site and
- l) all activities and work - including supply, transport, handling, storage, removal and disposal of all materials and provision of all resources - required to meet the requirements of Clause 6.3 of Annexure MRTS11.1.

**Item 40722 Spreading prime cover material, [*spread rate*], [*including | excluding*] supply of prime cover material, [*location*]**

**Item 40723 Spreading cover aggregate [*size*], [*spread rate*], [*including | excluding*] supply of cover aggregate, [*location*]**

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of prime cover material or cover aggregate other than that supplied by the Principal as stated on Principal Supplied Material List (Form C7827)
- c) transport, handling and stockpiling of material
- d) associated material compliance testing
- e) loading, hauling, spreading, rolling (including the use of Coverage Tracking (CT) rollers where specified) and brooming of material, and
- f) removal and disposal of excess material from the Site.

**Item 40724 Sprayed bituminous treatment, type [*treatment type*], [*including | excluding*] supply of cover aggregates, [*location*], refer to Clause 2 of Annexure MRTS11.1**

Standard Work Item 40724 is to be used only for small areas that are difficult to quantify by the method in Clause 2.3.2, including, for example, turnouts and gore areas.

In this application a single Work Item is scheduled for each seal treatment type, which covers all aspects of the works excluding transport of materials supplied by the Principal (where applicable).

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, geotextile, prime cover material or cover aggregates, other than that supplied by the Principal as stated on Principal Supplied Material List (Form C7827)
- c) transport, handling and storage of material
- d) associated material compliance testing
- e) preparation of the surface prior to spraying
- f) loading the relevant materials into the sprayer
- g) incorporating, mixing and heating materials, as relevant
- h) spraying

- i) unloading materials from the sprayer, if necessary
- j) cleaning roadside items, if necessary
- k) loading, hauling, spreading of prime cover material or cover aggregate
- l) rolling and brooming of prime cover material or cover aggregate
- m) removal and disposal of excess material from the Site, and
- n) all activities and work - including supply, transport, handling, storage, removal and disposal of all materials and provision of all resources - required to meet the requirements of Clause 6.3 of Annexure MRTS11.1.

**Item 40725P Supply and addition of adhesion agent (Provisional Quantity)**

**Item 40729P Supply and addition of cutter oil (Provisional Quantity)**

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) supply, addition and mixing of cutter oil or adhesion agent, if applicable.

Note: Refer to Clause 2.3.4 for the limits of accuracy that apply to provisional quantities for these work items.

**2.3 Methods of quantifying sprayed bituminous treatment**

**2.3.1 General**

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

- a) by measuring the quantities of materials used in the sprayed bituminous treatment, and
- b) by measuring the required area of sprayed bituminous treatment.

**2.3.2 Quantifying by materials used**

In this method, the sprayed bituminous treatment is quantified by measuring the quantities of materials used in the surfacing operation including bituminous materials, aggregates, and additives.

The quantities of the works shall be determined in accordance with Clauses 2.4.1 to 2.4.4.

When quantifying by materials used, one seal treatment may need to be scheduled as a number of Work Items. For example, a prime plus double/double seal would be scheduled with the following items:

**Guide Note Table 2.3.1 – Example of Scheduling Work Items**

Activity	Work Item	Description	Unit
Prime	40721.01	Spraying bituminous material, treatment type [ <i>Initial treatment – Prime</i> ], binder [AMC0], spray rate [0.8 L/m <sup>2</sup> ], [Pavement A, MC01, Ch.0 ~ 1000]	litre
First application of binder – D/D	40721.02	Spraying bituminous material, treatment type [ <i>Secondary Treatment – D/D</i> ], binder [C170], spray rate [1.2 L/m <sup>2</sup> ], [Pavement A, MC01, Ch.0 ~ 1000, D/D first coat]	litre
First application of cover aggregate – D/D	40723.01	Spreading cover aggregate [14 mm], [110 m <sup>2</sup> /m <sup>3</sup> ], [including] supply of cover aggregate, [Pavement A, MC01, Ch.0 ~ 1000, D/D first coat]	m <sup>3</sup>
Second application of binder – D/D	40721.03	Spraying bituminous material, treatment type [ <i>Secondary Treatment – D/D</i> ], binder [C170], spray rate [0.6 L/m <sup>2</sup> ], [Pavement A, MC01, Ch.0 ~ 1000, D/D second coat]	litre
Second application of cover aggregate – D/D	40723.02	Spreading cover aggregate [7 mm], [250 m <sup>2</sup> /m <sup>3</sup> ], [including] supply of cover aggregate, [Pavement A, MC01, Ch.0 ~ 1000, D/D second coat]	m <sup>3</sup>
Adhesion Agent	40725.01P	Supply and addition of adhesion agent (Provisional Quantity)	litre
Cutter Oil	40729.01P	Supply and addition of cutter oil (Provisional Quantity)	litre

### 2.3.3 Quantifying by area

In this method, the sprayed bituminous treatment is quantified by measuring the area over which the bituminous treatment is applied within the tolerances given in Clause 12.10 of MRTS11.

The quantities of the works shall be determined in accordance with Clauses 2.4.4 to 2.4.5.

This method is to be used only for small areas that are difficult to quantify by the method in Clause 2.3.2 above, including, for example, turnouts and gore areas.

In this application a single Work Item is scheduled for each seal treatment type, which covers all aspects of the works excluding transport of materials supplied by the Principal (where applicable). The transport of materials supplied by the Principal must therefore be scheduled as a separate Work Item.

### 2.3.4 Limits of accuracy for provisional quantities

The limits of accuracy for provisional quantities shall be as specified in Clause 2.1.7 of MRS01 *Introduction to Specifications* except for Work Item 40725P and Work Item 40729P. For these Work Items, where the Work Item Number contains a suffix “P” and the words “Provisional Quantity” appear in the description of the Works Item, the Contractor shall be entitled to be paid for the works with the applicable limits of accuracy for the quantities of plus 100% minus 100%.

## 2.4 Calculation of quantities

### 2.4.1 Spraying bituminous materials

The quantities of bituminous materials at 15°C shall be determined from the tally of actual quantities sprayed on each spray run as recorded on the spray sheet, or the adjusted design spray rate + 5% whichever is the lesser. For a spray run of less than 500 litres, the quantity shall be calculated from the Designed Spray Rate.

### 2.4.2 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 as recorded on the spray sheet, or the adjusted design spread rate + 10% whichever is the lesser. In order to confirm these quantities, the Administrator may order a stocktake of quantities from the Contractor’s delivery dockets and any balance remaining in stockpiles. For a spray run with a quantity of less than 1 m<sup>3</sup> of aggregate, the quantity shall be calculated from the Designed Spread Rate.

### 2.4.3 Cutter oil and adhesion agent

The quantities of cutter oil and/or adhesion agent, recorded in litres, shall be determined from the tally of actual quantities incorporated into the binder used on the Works as recorded on the spray sheet.

Table 2.4.3 details where cutter oil and/or adhesion agent, if used, will be entitled for payment.

**Table 2.4.3 – Entitlement of payment for cutter oil and adhesion agent**

Treatment	Entitlement of Payment (yes/no)		
	Cutter Oil	Adhesion Agent	Comments
Initial Treatment - Prime	No	No – not used	Cutter oil incorporated into the binder as ‘cutback bitumen’ – no additional payment
Initial Treatment - Initial Seal	No	Yes	Cutter oil incorporated into the binder as ‘cutback bitumen’ – no additional payment
Secondary Treatments and Retreatments (excluding Surface Enrichment)	Yes	Yes	
Surface Enrichment	No	No – not used	Cutter oil incorporated into the binder as ‘cutback bitumen’ – no additional payment

#### 2.4.4 Transport of material supplied by the Principal

The quantity for transport of prime cover material and/or cover aggregates supplied by the Principal will be calculated in accordance with MRS22 *Supply of Cover Aggregate*.

The quantity for transport of geotextile supplied by the Principal will be calculated in accordance with MRS57 *Geotextiles for Paving Applications*.

#### 2.4.5 Sprayed bituminous surfacing treatment by area

The quantity of sprayed bituminous treatment when specified by area shall be measured from the actual areas sprayed in accordance with the Contract within the tolerances given in Clause 12.10 of MRTS11.

### 2.5 Supply of materials

Aggregate materials, and geotextile can be supplied by either the Principal or the Contractor. Binder, cutter oil and adhesion agent shall always be supplied by the Contractor.

Material to be supplied by the Principal will be as listed on the Principal Supplied Material List (Form C7827). Any material not listed on the Principal Supplied Material List shall be supplied by the Contractor.

Where materials are to be supplied by the Principal, the transport of these materials shall be scheduled using relevant Work Items listed in Table 2.5.

**Table 2.5 – Work Items for transport of Principal supplied material**

Principal Supplied Material	Specification	Standard Item No.
Cover aggregate or prime cover material	MRS22 <i>Supply of Cover Aggregate</i>	41004
Geotextile	MRS57 <i>Geotextiles for Paving Applications</i>	43402

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

#### 3.1 Maximum reductions in standards

A lot which has an Actual Spray Rate outside plus or minus 10% of the Adjusted Designed Spray Rate shall not be accepted for a reduced level of service.

A lot which has an amount of cover aggregate spread outside - 20% or + 20% of the Adjusted Designed Spread Rate shall not be accepted for a reduced level of service.

The maximum reduction in properties for bitumen and polymer modified binder shall be determined by the Administrator.

#### 3.2 Determination of the reduced value

##### 3.2.1 Bitumen

For sprayed bituminous treatments that contain bitumen, the percentage reduction in value due to nonconforming bitumen shall be determined based on the viscosity (at 60°C) of the bitumen at point of delivery.

This percentage reduction in value shall be as stated in Table 3.2.1 and applied to the scheduled rates for Work Items 40721, or 40724 as applicable.

**Table 3.2.1 – Reduction in value, point of delivery binder properties for bitumen**

Viscosity at 60°C (Pa.s)	% Reduction in Value
<b>Class 170</b>	
from 135 to 96	1% for each 4 Pa.s, or part thereof, below 136 Pa.s
from 95 to 76	10% plus 1% for each 2 Pa.s, or part thereof, below 96 Pa.s
from 75 to 56	20% plus 1% for each 1 Pa.s, or part thereof, below 76 Pa.s
less than 56	40% plus 3% for each 1 Pa.s or part thereof, below 56 Pa.s
from 207 to 356	1% for each 2 Pa.s, or part thereof, above 206 Pa.s
Greater than 356	75% plus 1% for each 1 Pa.s, or part thereof, above 356 Pa.s
<b>Class 320</b>	
from 251 to 222	1% for each 3 Pa.s, or part thereof, below 252 Pa.s
from 221 to 202	10% plus 1% for each 2 Pa.s, or part thereof, below 222 Pa.s
less than 202	20% plus 2% for each 1 Pa.s, or part thereof, below 202 Pa.s
from 393 to 592	1% for each 4 Pa.s, or part thereof, above 392 Pa.s
Greater than 592	50% plus 1% for each 2 Pa.s, or part thereof, above 592 Pa.s

### 3.2.2 Polymer modified binder

For sprayed bituminous treatments that contain polymer modified binder, the percentage reduction in value due to nonconforming polymer modified binder (PMB) shall be determined based on the softening point and torsional recovery of the binder at the point of delivery.

This percentage reduction in value shall be as stated in Table 3.2.2(a) and Table 3.2.2(b) and applied to the scheduled rates for Work Items 40721, or 40724 as applicable.

Where both the softening point and torsional recovery of the binder at point of delivery are nonconforming, the percentage reductions shall be added.

**Table 3.2.2(a) – Reduction in value, softening point at point of delivery for PMBs**

Softening Point (°C)	% Reduction in Value
1 – 5°C below the specified limit <sup>1</sup>	5
6 – 10°C below the specified limit <sup>1</sup>	10
> 10°C below the specified limit <sup>1</sup>	15

Note

<sup>1</sup> Specified limits are given in Table 8.1 of MRTS18.

**Table 3.2.2(b) – Reduction in value, torsional recovery at point of delivery for PMBs**

<b>Torsional Recovery (%)</b>	<b>% Reduction in Value</b>
1 – 10% below the specified limit <sup>1</sup>	5
11 – 20% below the specified limit <sup>1</sup>	10
> 20% below the specified limit <sup>1</sup>	15

Note

<sup>1</sup> Specified limits are given in Table 9.3.2.2 of MRTS18.

For bitumen and polymer modified binder that does not conform to the point of delivery requirements in MRTS17 and / or MRTS18 but has been assessed by the Administrator as being suitable to remain in the Works, the project's defect liability / correction period for sprayed seals containing nonconforming binder would typically be extended to a period of at least 24 months after the date of installation, as the performance implications associated with the nonconformance cannot be fully evaluated until it has been subject to periods of sustained hot and cold weather.

### 3.2.3 Application

The percentage reduction in value due to nonconforming application rate shall apply to the scheduled rates for Work Items 40721, 40722, 40723, or 40724, as applicable.

The percentage reduction in value shall be as stated in Table 3.2.3(a) and Table 3.2.3(b). The percentage differences in spray rates and spread rates shall be rounded to the nearest whole number.

**Table 3.2.3(a) – Reduction in value, actual spray rate**

<b>% Difference from Adjusted Designed Spray Rate</b>	<b>% Reduction in Value</b>
± 6	4
± 7	8
± 8	12
± 9	16
± 10	20

**Table 3.2.3(b) – Reduction in value, actual cover aggregate spread rate**

<b>% Difference from Adjusted Designed Spread Rate</b>		<b>% Reduction in Value</b>
<b>Lighter Spread</b>	<b>Heavier Spread</b>	
- 11 to - 13	+ 11 to + 13	5
- 14 to - 17	+ 14 to + 17	10
- 18 to - 20	+ 18 to + 20	15

### 3.2.4 Multiple reductions

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

#### **4 Principal supplied materials**

##### ***4.1 Additional Principal supplied materials used to rectify a rejected lot***

Where a lot or part of a lot has been rejected and the Contractor chooses to use additional Principal supplied materials to rectify part or all of the lot, the cost of the additional Principal supplied materials shall be deducted from the payment made to the Contractor. No payment will be made to the Contractor for transport of this quantity of Principal supplied material.

Where a lot or part of a lot is nonconforming and exceeds the maximum reductions in standards specified in Clause 3.1 but is accepted by the Principal, the cost of any Principal supplied materials used in excess of the limits given in this specification for the lot, or part of the lot, shall be deducted from the payment made to the Contractor.

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

Superseded

Superseded