Specification (Measurement)

Transport and Main Roads Specifications MRS30 Asphalt Pavements

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1 Introduction

This Specification applies to the construction of asphalt pavements using the following asphalt types:

a) Medium duty dense graded asphalt (AC7M, AC10M, AC14M and AC20M)

b) Heavy duty dense graded asphalt (AC7H, AC10H, AC14H and AC20H)

c) Open graded asphalt (OG10 and OG14), and

d) Stone mastic asphalt (SMA10 and SMA14).

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
Preparation of the Existing Surface		
41701	Preparation of the existing surface	m²
41702P	Crack filling (Provisional Quantity)	m
41706P	Strain alleviating membrane fabric strips (Provisional Quantity)	m
41710P	Tack coat, residual bitumen (Provisional Quantity)	litre
Medium Duty Dense Graded Asphalt		
41751	Medium duty dense graded asphalt in corrector course, AC [*nominal size*] M mix	tonne
41752	Medium duty dense graded asphalt in base course, AC [*nominal size*] M mix	tonne
41753	Medium duty dense graded asphalt in intermediate course, AC [*nominal size*] M mix	tonne
41754	Medium duty dense graded asphalt in surfacing course, AC [*nominal size*] M mix	tonne
Heavy Duty Dense Graded Asphalt		
41801	Heavy duty dense graded asphalt in corrector course, AC [*nominal size*] H mix	tonne
41802	Heavy duty dense graded asphalt in base course, AC [*nominal size*] H mix	tonne
41803	Heavy duty dense graded asphalt in intermediate course, AC [*nominal size*] H mix	tonne
41804	Heavy duty dense graded asphalt in surfacing course, AC [*nominal size*] H mix	tonne

Standard Item No	Description	Unit of Measurement
Open Graded Asphalt		
41851	Open graded asphalt in surfacing course, OG [*nominal size*] mix	tonne
Stone Mastic Asphalt		
41901	Stone mastic asphalt in surfacing course, SMA [*nominal size*] mix	tonne
41902	Supply and application of grit to the surface of stone mastic asphalt	tonne

2.2 Work Operations

Item 41701 Preparation of the existing surface

Work Operations incorporated in the above item include:

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

b) cutting back existing adjoining pavement to a vertical face

c) cleaning/sweeping the existing surface

d) treatment of surface imperfections, and

e) removal of raised extruded thermoplastic road markings and raised pavement markers.

Item 41702P Crack filling (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 of crack sealant, and

c) cleaning and filling of cracks.

Item 41706P Strain alleviating membrane fabric strips (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 of all materials

c) preparing existing surfaces

d) applying bituminous emulsion or proprietary primer, and

e) installing strain alleviating membrane fabric strips.

Item 41710P Tack coat, residual bitumen (Provisional Quantity)

Work Operations incorporated in the above item include:

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

b) supply and application of tack coat.

Item 41751 Medium duty dense graded asphalt in corrector course, AC [nominal size] M mix

Item 41752 Medium duty dense graded asphalt in base course, AC [nominal size] M mix

Item 41753 Medium duty dense graded asphalt in intermediate course, AC [nominal size] M mix

Item 41754 Medium duty dense graded asphalt in surfacing course, AC [nominal size] M mix

Item 41801 Heavy duty dense graded asphalt in corrector course, AC [nominal size] H mix

Item 41802 Heavy duty dense graded asphalt in base course, AC [nominal size] H mix

Item 41803 Heavy duty dense graded asphalt in intermediate course, AC [nominal size] H mix

Item 41804 Heavy duty dense graded asphalt in surfacing course, AC [nominal size] H mix

Item 41851 Open graded asphalt in surfacing course, OG [nominal size] mix

Item 41901 Stone mastic asphalt in surfacing course, SMA [nominal size] mix

Work Operations incorporated in the above items include:

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

b) being a suitably prequalified asphalt contractor or engaging a subcontractor who is a suitably prequalified asphalt contractor

c) having a registered mix design or obtaining a registered mix design

d) manufacture of asphalt in accordance with the registered mix design(s)

e) delivery of asphalt to the Works

f) laying, compacting and finishing the asphalt

g) providing an allowance for asphalt used in temporary ramps and asphalt lost from cut-offs from joints

h) provision of laboratory and compliance testing facilities

i) sampling, testing and quality assurance requirements

j) delivery of the results for all tests and inspections to the Administrator by the nominated time, and

k) removal and disposal of any nonconforming material or product, or any material or product not utilised for a reduced level of service, and replacement with conforming material or product.

Item 41902 Supply and application of grit to the surface of stone mastic asphalt

Work Operations incorporated in the above item include:

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

b) winning and processing of the material, and

c) loading, delivery, stockpiling, hauling, spreading and rolling of the grit.

2.3 Calculation of quantities

2.3.1 Preparation of the existing surface

The preparation of the existing surface shall be measured as the area over which the asphalt is laid.

2.3.2 Tack coat

The quantity of the tack coat, as residual bitumen at 15ºC, shall be determined from the area on which the tack coat is placed and the nominated application rate of residual bitumen.

2.3.3 Asphalt

Each load of asphalt delivered to the works must be accompanied by a delivery docket that quantifies the amount of asphalt contained within the load and collected at the point of delivery. The quantity of asphalt must be measured in accordance with the *National Measurement Act* 1960 and *National Trade Measurement Regulation* 2009.

The quantity of asphalt incorporated in the final work must be mutually agreed using the tally of the weighbridge dockets of delivered asphalt less:

a) the quantity of asphalt which does not remain in the Works (such as asphalt in temporary ramps, cut-off joints and spillages or that remaining on or in construction plant), and

b) any amount of asphalt which exceeds the upper vertical and horizontal geometric tolerances but is accepted to remain in the Works by the Administrator.

2.3.4 Grit

The quantity of grit shall be calculated based on the actual area of asphalt that is gritted and the nominated spread rate for the grit.

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

The Contractor may elect to approach the Principal, via the Administrator, with a written proposal about how rejected lots, or rejected lots not accepted for a reduced level of service, may be retained. If accepted, the relevant details about the outcome should be captured on the Transport and Main Roads asphalt warranty register.

3.1 Acceptance of nonconformances

Pre-determined acceptance criteria in the form of payment deduction(s), as provided in this Specification, will be applied to nonconformances for the following properties:

a) asphalt mix properties:

   i. particle size distribution and binder content in asphalt

   ii. air voids in laboratory compacted specimens below the minimum limit

b) insitu air voids:

   i. insitu air voids in excess of the upper limit

   ii. insitu air voids below the lower limit (for layers other than the final surfacing)

c) road roughness.

Deductions apply to the scheduled rate for the quantity of asphalt represented by the test sample (lot or sub-lot as appropriate).

The requirements of Clause 1.2 of MRTS30 *Asphalt Pavements* still apply to asphalt accepted for utilisation at a reduced level of service under this clause.

Transport and Main Roads accepts asphalt for utilisation at a reduced level of service based on the requirements of Clause 3.1 being satisfied. However, it may not be appropriate to apply these pre-determined dispositions for specific high risk / high profile projects. Where it is determined that application of these pre-determined dispositions is not appropriate, it will be stated elsewhere in the Contract that the requirements of Clause 3.1 do not apply.

3.2 Asphalt mix properties

Deductions in accordance with Table 3.2(a) will be applied to accepted nonconformances in combined particle size distribution and binder content provided that:

a) for any individual sieve size or binder content, nonconformances greater than twice the production tolerance specified in Table 7.4.3.2 of MRTS30 will not be accepted

b) deductions are cumulative and nonconformances will not be accepted if the combined particle size distribution and binder content deductions exceed 20%, and

c) for stone mastic asphalt, acceptance of nonconformances on the 4.75 mm sieve for SMA14 and 2.36 mm sieve for SMA10 is subject to the mix volume ratio being ≤ 1.04.

Table 3.2(a) – Deductions for particle size distribution and binder content nonconformances

Combined Particle Size Distribution Element	**% by which Nonconformance exceeds Production Tolerance (Clause 7.4.3.2 of MRTS30)**	**Deductions (% of Lot or Sub-lot Value)**
	(% by mass of total aggregate)	
Passing 37.5 mm	Each 2 or part thereof	1
Passing 26.5 mm	Each 2 or part thereof	1
Passing 19.0 mm	Each 2 or part thereof	1
Passing 13.2 mm	Each 2 or part thereof	1
Passing 9.50 mm	Each 2 or part thereof	1
Passing 6.70 mm	Each 2 or part thereof	1
Passing 4.75 mm	Each 2 or part thereof	1
Passing 2.36 mm	Each 1 or part thereof	1
Passing 1.18 mm	Each 1 or part thereof	1
Passing 0.600 mm	Each 1 or part thereof	1
Passing 0.300 mm	Each 1 or part thereof	2
Passing 0.150 mm	Each 0.5 or part thereof	2
Passing 0.075 mm	Each 0.5 or part thereof	2
Binder Content	**(% by mass of total asphalt mix)**	
All asphalt mixes	Each 0.1 or part thereof	3

Deductions in accordance with Table 3.2(b) will be applied to nonconformances in air voids in laboratory compacted specimens, provided the air voids in laboratory compacted specimens is not below the minimum limit specified in Table 7.2.2(a) of MRTS30 by more than 0.5% for mixes containing bitumen and multigrade bitumen binders and 1.0% for mixes containing polymer modified binders.

Table 3.2(b) – Deductions for insufficient air voids in laboratory compacted specimens

Air Voids Below the Minimum Specified Limit by (%)	Deduction (% of Lot or Sub-lot Value)	
	Mix Containing Bitumen and Multigrade Bitumen Binder	Mix Containing Polymer Modified Binder
0.1	5	2.5
0.2	10	5
0.3	15	7.5
0.4	20	10
0.5	25	12.5
0.6	Reduced level of service does not apply	15
0.7		17.5
0.8		20
0.9		22.5
1.0		25

For asphalt mix properties, the deduction that applies is the greater of:

a) The deduction determined in accordance with Table 3.2(a) for particle size distribution and binder content, or

b) The deduction determined in accordance with Table 3.2(b) for air voids in laboratory compacted specimens.

3.3 Insitu air voids

Deductions in accordance with Table 3.3(a) will be applied to nonconformances in excess of the upper characteristic value limit for insitu air voids (V_U), provided the nonconformance does not exceed the limit specified in Table 9.2.1(a) and Table 9.2.1(b) of MRTS30 by more than 2.0%.

Table 3.3(a) – Deduction for excessive insitu air voids

Insitu Air Voids in Excess of Specified Limit V_U by (%)	Deduction (% of Lot Value)	
	AC7M, AC7H, AC10M, AC10H, AC14M, AC14H, SMA10 and SMA14	AC20M and AC20H
≤ 0.5	2.5	5
0.6 – 1.0	7.5	15
1.1 – 1.5	15	30
1.6 – 2.0	30	50

Deductions in accordance with Table 3.3(b) will be applied to nonconformances that are below the lower characteristic value limit for insitu air voids (V_L) in courses other than the surfacing, provided the nonconformance is not below the lower limit specified in Table 9.2.1(a) and Table 9.2.1(b) of MRTS30 by more than 0.5%.

Table 3.3(b) – Deductions for insufficient insitu air voids

Layer	Insitu Air Voids Below the Minimum Specified Limit V_L by (%)	Deduction (% of Lot Value)
Surfacing	Reduced level of service does not apply	
All other layers	0.1	5
	0.2	10
	0.3	15
	0.4	20
	0.5	25

Pre-determined acceptance criteria have not been provided for surfacings with insitu air voids below the minimum limit because of the elevated risk of skid resistance deficiencies associated with this type of nonconformance.

3.4 Road roughness

Deductions in accordance with Table 3.4 will be applied to accepted nonconformances in road roughness provided that the international roughness index (IRI) does not exceed the specified limit by more than 0.80 m/km.

Table 3.4 – Deductions for road roughness

Road roughness (m/km)	Deduction (% of Lot Value)
< 0.25	2
0.25 – 0.43	4
0.44 – 0.61	8
0.62 – 0.80	16

Calculation of surface roughness should accurately represent the road roughness of the complete pavement. It is generally accepted that the inclusion of other road features within the pavement are likely to reduce road roughness.

In accordance with the test method adopted, these features are required to be noted during roughness testing. In accordance with MRTS30 *Asphalt Pavements*, the following features are allowed to be excluded from road roughness assessment:

- roundabouts
- railway lines
- bridge joints, and
- inspection pit covers (for example, drainage manholes).

The Contractor should nominate a methodology and provide calculations on road roughness for the Administrator's 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 be excluded from the road roughness assessment without the express agreement of the Administrator.

4 Incentives

Pre-determined asphalt surface course road roughness incentives shall be applied in accordance with Table 4.

Transport and Main Roads typically pays an incentive for achieving a higher standard of road roughness provided the requirements of Clause 4 are satisfied. However, it may not be appropriate to apply these pre-determined incentives for specific projects. Where it is determined that application of these pre-determined incentives is not appropriate, it will be stated elsewhere in the Contract that the requirements of Clause 4 do not apply.

Table 4 – Incentives for road roughness

Road roughness (m/km)	Incentive (% of Lot Value)
> 1.12	0
0.94 – 1.12	1
0.76 – 0.94	2
< 0.76	3