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WESTERN AUSTRALIA SPECIFICATION

245

ASPHALTIC CONCRETE

Please use “Austroads Framework for Specifying Asphalt (AP-T18)” which is available as a pdf file on the Australian Asphalt Pavement Association website.

WESTERN AUSTRALIA

SPECIFICATION
245
ASPHALT CONCRETE

Note:

~~(The Western Australian IPWEA Asphaltic Concrete Specification is being updated and converted into the AUS-SPEC format. When complete it will be posted on the City of Swan web site.)~~ Please use “Austroads Framework for Specifying Asphalt (AP-T18)” which is available as a pdf file on the Australian Asphalt Pavement Association website (<http://www.aapa.asn.au/docs/AP-T18.pdf>).

Amendment Record for this Specification Part

This Specification is Council's edition of the AUS-SPEC generic specification part and includes Council's primary amendments.

Details are provided below outlining the clauses amended from the Council edition of this AUS-SPEC Specification Part. The clause numbering and context of each clause are preserved. New clauses are added towards the rear of the specification part as special requirements clauses. Project specific additional script is shown in the specification as italic font.

The amendment code indicated below is 'A' for additional script 'M' for modification to script and 'O' for omission of script. An additional code 'P' is included when the amendment is project specific.

Amendment Sequence No.	Key Topic addressed in amendment	Clause No.	Amendment Code	Author Initials	Amendment Date
<i>EXAMPLE 1</i>	<i>Provision for acceptance of nonconformance with deduction in Payment</i>	<i>XYZ.00</i>	<i>AP</i>	<i>KP</i>	<i>2/6/97</i>
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ASPHALTIC CONCRETE**

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SPECIFICATION 245: ASPHALTIC CONCRETE

GENERAL

245.01 SCOPE

1. The work to be executed under this Specification consists of the design, production and placing of asphalt including the supply of materials, sampling, testing and any other operations necessary to provide asphalt in accordance with the provisions of the Contract. The extent of the Contractor's work shall include:

Extent of Work

- (a) Sampling and testing of materials and the design of asphalt mixes required by the Contract.
- (b) Manufacture of the production mix.
- (c) Provision of a testing laboratory.
- (d) Transport of asphalt.
- (e) Laying and compaction of asphalt.
- (f) Sampling and testing.

245.02 REFERENCE DOCUMENTS

1. Documents referenced in this Specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated.

***Documents
Standards
Test Methods***

(a) Council Specifications

201 - Control of Traffic

(b) Australian Standards

- AS 1160 - Bitumen emulsions for the construction and maintenance of pavements.
- AS 2008 - Residual bitumen for pavements.
- AS 2150 - Hot mix asphalt.
- AS 2706 - Numerical values - Rounding the interpretation of limiting values.
- AS 2734 - Asphalt (hot-mixed) paving - Guide to good practice.
- AS 2758.5 - Asphalt aggregates.

(c) Test Methods

Main Roads Western Australia - Material Testing Manual.

(d) Other

AAPA publication - Asphalt Plant Process Control Guide.

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245.03 PLANT

1. The Contractor shall provide all the plant, equipment and labour necessary for carrying out the work in accordance with this Specification.
2. All plant and equipment used on the work shall be in accordance with the Contractor's submitted quality documentation and kept in good operating condition. The Contractor shall not use in the work any plant or equipment demonstrated to be faulty in operation so as to effect the product quality or unsafe in operation as assessed by the Superintendent.
3. All plant shall be registered and insured as appropriate to its use on a public road and shall comply with statutory environmental regulations.

***Contractor's
Responsibility***

***Plant to be
Suitable***

245.04 CONTROL OF TRAFFIC

1. The Contractor shall provide for traffic in accordance with the requirements of the Specification for CONTROL OF TRAFFIC while undertaking the work. No road/ street/ lane shall be fully closed to traffic without the prior approval of Council being obtained by the Superintendent.
2. Any costs incurred as a result of the supply of labour and materials complying with the Specification for CONTROL OF TRAFFIC shall be borne by the Contractor unless otherwise agreed with the Superintendent.
3. The Contractor shall take all necessary steps to avoid or minimise delays and inconvenience to road users during the course of the work but without compromise to the safety of the road users or employees.

***Provision for
Traffic***

***Contractor's
Cost***

Delays

245.05 WORK RECORDS

1. Particulars of the work performed shall be recorded by the Contractor on the Asphalt Work Record attached as Annexure 245A or as per the Contractor's own procedures and documentation where equivalent. The Contractor shall complete the Asphalt Work Record, which shall be countersigned by the Superintendent each day as a true record of the work performed. A copy shall be supplied to the Superintendent daily.
2. Delivery dockets stating the mass of each truck load of asphalt shall be attached to the Asphalt Work Record.

***Asphalt Work
Record***

***Delivery
Dockets***

MATERIALS

245.06 AGGREGATES

1. All aggregates used will meet the requirements of AS 2758.5 – Asphalt Aggregates. The aggregate shall be produced from a source rock as specified in Annexure 245B.

***Aggregate
Requirements***

245.07 BITUMEN

1. Bitumen will be Class 170 or 320 as specified in Annexure 245B unless otherwise directed by the Superintendent and will meet the requirements of AS 2008 –

***Bitumen
Requirements***

Residual Bitumen for Pavements.

MIX DESIGNS

245.08 GENERAL

1. All mix supplied for this contract will generally be a nominal AC5, AC7, AC10, RAC10, AC14, RAC14 or AC20, though other mix types may be used at the direction of the Superintendent. For specific sites nominated in the drawings, the Technical Specification - General or listed in a Superintendent's instruction, the required compactive effort for mix design testing will be nominated as 35, 50 or 75 blow Marshall compaction.

Mix Type

245.09 JOB MIXES

1. The Contractor will submit 'Job Mixes' for each mix type, using 75, 50 and 35 blow Marshall compactive efforts as instructed and conforming to the properties listed in Tables 245.1 to 245.4. The range of job mixes required for the contract shall be listed in Annexure 245B.

Details of Job Mixes

2. On acceptance of a 'Job Mix', the permissible variation of aggregate grading and bitumen content shall comply with AS 2150 clause 5.2.1 and not exceed the tolerances set out in Table 7 of AS 2150. The minimum calculated bitumen film thicknesses shall be 7.5 micron using the Hveem method of calculation.

245.10 ALTERNATIVE MIXES

1. Should tenderers wish to submit alternative mix designs; e.g. gap graded asphalt which are outside of the specifications, details of the mix designs and tender prices shall be included. Mixes with properties other than those listed in Tables 245.1 to 245.3 may be called for by the Principal and these shall be listed and detailed for properties as set out in Table 245.1 to 245.3 with the Principal's required values as an extension to Annexure 245B.

Details of Alternative Mixes

Property	Mix Designation		
	AC10	AC14	AC20
Grading Limits % passing AS Sieve			
26.5mm			100
19.0mm		100	90-100
13.2mm	100	85-100	75-90
9.5mm	90-100	70-85	60-80
6.7mm	70-90	62-75	50-70
4.75mm	58-76	53-70	40-60
2.36mm	40-58	35-52	25-43
1.18mm	27-44	24-40	18-35
600µm	17-35	15-30	14-27
300µm	11-24	10-24	9-21
150µm	7-16	7-16	6-15
75µm	4-7	4-7	3-7
Bitumen Content	5.0-7.0	4.5-6.5	4.0-6.0
Marshall Voids (%)	50 blow	4.0-6.0	4.0-6.0
	75 blow	4.0-6.0	4.0-6.0
Minimum Marshall Stability	50 blow	6.5kN	6.5kN
	75 blow	8.0kN	8.0kN
Marshall Flow (mm)	2.0-4.0	2.0-4.0	2.0-4.0
Marshall Quotient (min) (kN/mm)	50 blow	1.7	1.7
	75 blow	2.0	2.0
Traffic Recommendations: - Over 20 years Design Traffic			
Traffic Application Range/Type	Nominated Testing Compactive Effort	Bitumen Type	
Heavy truck traffic	75 blow	Class 320	
Less than 2,000,000 ESA	50 blow	Class 170	
Greater than 2,000,000 ESA	75 blow	Class 320	
Maintenance	50 blow	Class 170	
Intersections	75 blow	Class 320	

TABLE 245.1 - Asphalt Mixes : Highways, Arterial, Industrial And Distributor Roads

Property	Mix Designation		
	AC7	RAC10	RAC14
Grading Limits % passing AS Sieve			
19.0mm			100
13.2mm		100	90-100
9.5mm	100	95-100	70-90
6.7mm	80-100	80-95	62-75
4.75mm	70-90	65-80	47-67
2.36mm	45-60	45-60	34-52
1.18mm	35-50	35-50	25-41
600µm	22-35	25-40	16-32
300µm	14-25	15-25	9-21
150µm	8-16	7-15	5-13
75µm	5-8	3-10	2-8
Bitumen Content	5.0-7.0	4.5-6.5	4.5-6.5
Marshall Voids (%)	35 blow	3.0-5.0	3.0-5.0
	50 blow	3.0-5.0	3.0-5.0
Minimum Marshall Stability	35 blow	4.0kN	5.5kN
	50 blow	5.5kN	6.5kN
Marshall Flow (mm)	35 blow	2.0-5.0	2.0-5.0
	50 blow	2.0-4.0	2.0-4.0
Marshall Quotient(min) (kN/mm)	35 blow	1.0	1.0
	50 blow	1.7	1.7
Traffic Recommendations: - Over 20 years Design Traffic			
Traffic Application Range/Type	Nominated Testing Compactive Effort		Bitumen Type
Greater than 500,000 ESA	Use distributor road mix		
Greater than 500,000 ESA	50 blow		Class 170
Less than 500,000 ESA	35 blow		Class 170
Maintenance	50 blow		Class 170

TABLE 245.2 - Asphalt Mixes : Residential Streets / Cul De Sacs

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Property	Mix Designation	
	AC5	AC7
Grading Limits % passing AS Sieve		
9.5mm		100
6.7mm	100	80-100
4.75mm	85-100	70-90
2.36mm	55-75	45-60
1.18mm	38-57	35-50
600µm	26-43	22-35
300µm	15-28	14-25
150µm	8-18	8-16
75µm	4-11	5-8
Bitumen Content	5.0-7.0	5.0-7.0
Marshall Voids (%)	35 blow	3.0-5.0
	50 blow	3.0-5.0
Minimum Marshall Stability	35 blow	4.0kN
	50 blow	5.0Kn
Marshall Flow (mm)	2.0-5.0	2.0-5.0
Marshall Quotient (min) (kN/mm)	35 blow	1.0
	50 blow	1.7
Traffic Recommendations: - Over 20 years Design Traffic		
Traffic Application Range/Type	Nominated Testing Compactive Effort	
Cycle Paths, Basketball Courts etc	35 blow	
Maintenance	50 blow	

Note: Bitumen shall be Class 170 unless otherwise requested by the Superintendent.

TABLE 245.3 - Asphalt Mixes : Recreational Areas

TESTING

245.11 GENERAL

1. The testing of the asphaltic pavement shall be carried out by a laboratory with NATA accreditation for asphalt testing and approved by the Principal. All tests shall be made on a single sample test lot which consists of one (1) sample of loose asphalt extracted on site and six (6) random core samples taken from the compacted asphaltic mat. A test lot may be a days paving on a single project, the entire project or a section of suspect pavement surface. All tests shall be carried out in accordance with the current Australian and/or Main Roads WA standard.

Testing of Asphaltic Pavement

245.12 DISPUTE RESOLUTION

1. If a rejection of work is in dispute, the Contractor may apply to have a retest carried out at the Contractor's cost. The retest shall consist of removal of a random sample of the compacted asphaltic mat (1m x 1m). This shall be divided into two samples, one sample to be tested by a laboratory of the Contractor's choice, and the other sample tested by a laboratory of the Principal's choice. These tests are to be carried out in accordance with the current Australian and/or Main Roads WA standard. The mean result of the two tests shall be the definitive result.

Retest of Asphaltic Pavement

2. The Superintending Officer reserves the right to witness any testing that is part of dispute procedures.

3. The costs of retesting shall remain the responsibility of the Contractor should the rejection of work be confirmed, otherwise they shall be borne by the Principal.

4. Where the Contractor considers that failure to achieve the specified quality of the asphaltic mat is due to deficiencies in the base preparation, the Contractor shall arrange independent testing of the base compaction by a NATA registered laboratory or level survey by a licensed land surveyor. In the event that the basework is found to be deficient, the cost of the additional testing and any remedial measures shall be borne by the Principal.

Testing of Basework

MANUFACTURE

245.13 GENERAL

1. All mix shall be manufactured according to the requirements of AS 2150 – Hot Mix Asphalt and AS 2734 – Asphalt (Hot-mixed) Paving – Guide to Good Practice, unless otherwise directed by this specification or the Superintendent.

Mix Details

PREPARATION

245.14 PROGRAMMING

1. Programming of works shall be discussed and agreed with the Superintendent prior to commencement.

Commencement of Work

2. The works within the contract need not be continuous but the Contractor shall have the approval of the Superintendent prior to stopping work. The point of cessation shall be approved and in no circumstances shall it be in a location considered to be detrimental to the completed job or result in an unsafe condition for traffic or pedestrians.

245.15 PREPARATION OF PAVEMENT

(a) Responsibility for Base Quality

1. The Superintendent accepts full responsibility for the quality of the base preparation. Where the Superintendent is aware of any deficiencies in the base preparation, these will be brought to the attention of the Contractor and confirmed in writing. The Superintendent will provide compaction and field moisture content test results when requested, should these be available. This acceptance of responsibility for the quality of the base preparation must be supported by a minimum amount of testing for level, density, and deflection, to define adequately the smoothness and stiffness of the pavement.

Deficiencies in Base

2. The Contractor will inspect every paving job with the Superintendent prior to paving commencing. Should the Contractor be concerned with any aspect of the surface preparation, base construction or irregularities in the base prior to or during paving operations, such concerns shall be brought to the attention of the Superintendent. This shall be confirmed in writing.

Prior Inspection

(b) Rectification of Pavement Surface

1. The Contractor shall repair any damage to the existing pavement surface caused by the Contractor's activities. Affected areas designated by the Superintendent shall be removed and reinstated to the Superintendent's satisfaction. The cost of repairing such damage shall be borne by the Contractor.

Contractor's Responsibility, Contractor's Cost

2. Surface depressions of greater depth than twice the permissible tolerance of the layer are to be tack coated and squared where necessary, filled with fresh asphalt of appropriate nominal size and compacted before the subsequent course is placed. The asphalt in these patches shall be compacted to comply with the general level of the existing surface to the Superintendent's satisfaction.

Preparatory Patching

245.16 KEYING IN

1. The Contractor will be responsible for keying in work at each end of the job. This may be done by burning or 'chasing', and removing the existing asphalt. The method used will be that agreed with the Superintendent. Alternative methods may be negotiated between the Contractor and the Superintendent.

Keying in Work at Each End of Job

245.17 TACK COAT

1. Tack Coat shall be laid in accordance with AS 2734 - Asphalt (Hot-mixed) Paving – Guide to Good Practice, Section 5.

Tack Coat Details

2. Material shall be a bitumen emulsion and shall be in accordance with AS 1160 – Bituminous Emulsions for the Construction and Maintenance of Pavements. Anionic and Cationic bitumen may be used depending on site conditions and the time of year and should be discussed with the Superintendent.

3. The application rate shall generally be sufficient to fully coat the surface with a residual binder content of 0.10 litres per square metre. However, the application rate may be varied or even omitted to suit particular conditions when approved or instructed by the Superintendent.

245.18 CORRECTOR COURSE

1. When directed by the Superintendent, preparatory to resurfacing those areas in which there are departures of more than 20mm from a 3m straight edge, a separate regulating course shall be placed for correction of both longitudinal and transverse pavement shape. Unless directed otherwise, the maximum compacted thickness of any one layer of corrector course shall not exceed five times the size of the largest aggregate in the asphalt used.

***Corrector
Course***

LAYING OF MIX

245.19 DELIVERY

1. Should the Contractor be unable to supply asphalt and/or services within 7 days of that requested, the Council as Principal reserves the right to obtain the services of another Contractor to provide that programmed part of the Works. All mix shall be delivered according to the requirements of AS 2150 - Hot Mix Asphalt and AS 2734 - Asphalt (Hot-mixed) Paving – Guide to Good Practice, unless otherwise directed by the Superintendent. AS 2734 clause 7.6 determines required temperature of asphalt mixes at time of laying. The Contractor shall provide records which trace all asphalt from production to lot location. Such information shall be forwarded to the Superintendent daily.

***Delivery of Hot
Mix Asphalt***

245.20 SURFACE CONDITIONS

1. AS 2734 clause 4.5 determines acceptable surface conditions at time of laying. The Superintendent reserves the right to stop paving operations on the basis of surface conditions.

Wet Weather

245.21 PROTECTION OF ROAD FURNITURE & REMOVAL OF DEBRIS

1. The Contractor shall take all necessary precautions to prevent asphalt or other material used on the work from entering or adhering to gratings, hydrants or valve boxes, access chamber covers, bridge or culvert decks and other road fixtures. Immediately after the asphalt has been spread the Contractor shall clean off or remove any such material as directed by the Superintendent and leave the services and road fixtures in a condition satisfactory to the Superintendent.

***Contractor's
Responsibility***

2. During the progress of the work the Contractor shall remove all sweepings, spoil and excess or rejected material from the site to the satisfaction of the Superintendent. The disposal of such materials shall be in accordance with any requirements of the Council.

***Disposal of
Debris***

245.22 JOINTS

1. The compaction and surface finish at joints shall be similar to those of the remainder of the layer.
2. Unless otherwise directed by the Superintendent, longitudinal joints shall be:
 - continuous and parallel
 - coincident within 150mm of line of change in crossfall
 - offset by at least 150mm from joints in underlying layers
 - located away from traffic wheel paths
 - located beneath proposed traffic line markings where feasible, in the case of a wearing course.
3. Where practical, adjacent paving runs will be completed to within 20 metres of each other daily.

Details of Joints

245.23 LEVEL CONTROL

1. The Contractor shall take all necessary level control measures to meet the finished surface shape as set out in Clause 245.34.

Requirement of Surface Shape

245.24 SURFACE FINISH

1. It shall be the Contractor's responsibility to ensure that smoothness is maintained to within ± 10 mm over a 3m straight edge. Inability to maintain the required smoothness may result in rejection of the section.

Ride Quality

245.25 SPREADING AND COMPACTION

1. Spreading and compaction of the asphalt shall be carried out in a manner such that the finished pavement meets the Specification.

Pavement Meeting Specification

245.26 DELIVERY DOCKETS

1. A delivery docket showing the empty and loaded masses of the vehicle shall be attached to the Asphalt Work Record. In addition, the following written information shall be supplied:
 - the date and time of loading
 - the name of the supplier
 - the identification number of the vehicle
 - the size and Marshall blows of the asphalt and the location reference of the plant at which the asphalt was manufactured
 - the temperature of the asphalt

Record of Delivery

ACCEPTANCE OF ASPHALT PAVEMENT

245.27 GRADING AND BITUMEN CONTENT

1. Where the onsite job mix (aggregate grading, bitumen content, and film thickness) fails to meet the Specification, the Superintendent may reject the work in accordance with Clause 245.33 or alternatively with the agreement of the Superintendent, the Contractor shall provide a 5 year guarantee of the asphalt performance from the date of paving and the Contractor shall remove and replace or overlay the entire area should the surface show signs of distress. The method of repair shall be at the discretion of the Superintendent.

Failure of Job Mix to Meet Specification

2. When the results of an individual audit test undertaken by the Principal or the Contractor's field testing show that the mix does not meet the Specification, the Superintendent shall take into consideration the Process Control Records before deciding on a course of action, where the Contractor has in place a Process Control System as part of an accredited Quality Assurance System.

Individual Audit Test

245.28 MARSHALL CHARACTERISTICS

1. The Marshall characteristics (stability, flow and quotient) of a test lot when tested in accordance with the current Australian and/or Main Roads WA standard, shall form part of the determination for quality level of the asphalt.

Marshall Characteristics

2. The Marshall quotient is the calculated ratio of stability to flow which represents an approximation of the ratio of load to deformation and may be used as a measure of the asphalt's resistance to permanent deformation under load.

3. The Marshall characteristics of a test lot shall be judged on one of the three quality levels:

- Conformance
- Conditional Conformance
- Non-Conformance

4. If the stability and flow are both within or equal to the specification parameters as specified in Tables 245.1 to 245.3, the asphalt is deemed conforming to specification and the payment shall be made at the scheduled rate.

5. If the stability or flow is less than the minimum specified value, the mix shall be deemed non-conforming and no payment shall be made.

6. Where the mix is non-conforming, at the direction of the Superintendent, the Contractor shall arrange, at the Contractor's expense, for the test lot to be removed and replaced with fresh asphalt and retested. Removal shall be carried out so as not to damage the underlying layers or any road fixtures, such as gully gratings. Any such damage shall be repaired at the Contractor's expense.

Non-Conformance to Specification

7. Where the flow exceeds the maximum value, and the stability of the mix is high, then the mix shall be considered as conditionally conforming provided the minimum Marshall quotient value is met, and the flow does not exceed the maximum specified value by more than 1.0mm.

245.29 DENSITY

1. Density (compaction) shall be judged at one of three quality levels:

- Conformance
- Conditional Conformance
- Non-Conformance

2. When tested in accordance with 9.4 of AS 2734 - Asphalt (Hot-mixed) Paving – Guide to Good Practice, the Characteristic Percent Marshall Density (Compaction) for any test lot of a minimum 6 (six) Marshall Density tests shall be deemed to be conforming if it attains the minimum value required for the mix type as shown in Table 245.5. Payment for conforming work shall be at the scheduled rate.

Conformance

3. Where a Characteristic Percent Marshall Density is less than the specified density the quality level shall be deemed to be either non-conforming or conditionally conforming depending on the difference between the Characteristic Percent Marshall Density and the specified density. The tolerances applicable to conditional conformance are given in Table 245.5. A Pay Factor, as shown in Table 245.6 shall be applied for work at the appropriate conformance level in accordance with these tolerances. The pay factor shall reflect the lower level of serviceability of conditionally conforming asphalt.

Conditional Conformance

4. Where any test lot of asphalt work is deemed non-conforming, the Contractor shall arrange, at the Contractor’s expense, for the test lot to be removed and replaced with fresh asphalt and retested. Removal shall be carried out so as not to damage the underlying layers or any road fixtures, such as gully gratings. Any such damage shall be repaired at the Contractor’s expense. Alternatively, the pay factor shall apply.

Non-Conformance with Specification

Marshall Blows	Minimum Characteristic Marshall Density (Rc %)
35	95.0
50	94.5
75	94.0

TABLE 245.4 - Density Requirements

The Characteristic Percent Marshall Density, R_{ct} , of a test lot shall be calculated thus:

$$R_{ct} = R - 0.91S$$

where :

R is the mean of the results of the percentage of Marshall Density tests on the lot being assessed, reported to the nearest 0.1 percent.

S is the standard deviation of the results of the percentage of Marshall Density tests on the lot being assessed, calculated in accordance with the standard deviation calculation below and reported to the nearest 0.1 percent.

Rounding of all calculations should be in accordance with AS 2706 - Numerical Values - Rounding the Interpretation of Limiting Values.

Standard Deviation

Where specified the standard deviation(s) of the distribution of the values shall be calculated as:

$$S = \sqrt{\frac{\sum_{i=1}^n \left(x_i - \bar{x} \right)^2}{n - 1}}$$

where:

x_i is an individual result

\bar{x} is the mean of n results

n is the number of results from one lot

245.30 ASPHALTIC MAT VOIDS

1. The asphaltic mat voids is the relationship between the maximum density and the mean core density of a sample test lot. It is calculated thus:

Formula for Asphaltic Mat Voids

$$AMV = \left(\frac{MD - CD}{MD} \right) X 100$$

where:

AMV = Asphaltic mat voids

MD = The maximum density of a test lot (as determined by the Rice Method)

CD = The mean core density of a test lot

It shall be judged on one of three quality levels:

- Conformance
- Conditional Conformance
- Non-Conformance

In the case of 35 blow mixes:

35 Blow Mixes

2. Where the asphaltic mat voids is greater than or equal to 2.5 and less than or equal to 10.0, it shall be deemed as conforming.

3. Where the asphaltic mat voids is greater than 10.0 but less than or equal to 12.0, it shall be deemed as conditional conformance and a pay factor shall apply (refer to Table 245.7).

4. Where the asphaltic mat voids is less than 2.5 or greater than 12.0 it shall be deemed as non-conforming.

In the case of 50 blow mixes:

50 Blow Mixes

5. Where the asphaltic mat voids is greater than or equal to 3.5 and less than or equal to 10.0, it shall be deemed as conforming.

ASPHALTIC CONCRETE

6. Where the asphaltic mat voids is greater than 10.0 but less than or equal to 12.0, it shall be deemed as conditional conformance and a pay factor shall apply (refer to Table 245.7).

7. Where the asphaltic mat voids is less than 3.5 or greater than 12.0 it shall be deemed as non-conforming.

In the case of 75 blow mixes:

75 Blow Mixes

8. Where the asphaltic mat voids is greater than or equal to 3.5 and less than or equal to 11.0, it shall be deemed as conforming.

9. Where the asphaltic mat voids is greater than 11.0 but less than or equal to 12.0, it shall be deemed as conditional conformance and a pay factor shall apply (refer to Table 245.7).

10. Where the asphaltic mat voids is less than 3.5 or greater than 12.0, it shall be deemed as non-conforming.

11. Where any test lot of asphalt work is deemed non-conforming, the Contractor shall arrange, at the Contractor's expense, for the test lot to be removed and replaced with fresh asphalt and retested. Removal shall be carried out so as not to damage the underlying layers or any road fixtures, such as gully gratings. Any such damage shall be repaired at the Contractor's expense.

12. Where for any individual core the asphaltic mat voids is less than 3.0 for 75 blow mix or 2.5 for 50 blow or 2.0 for 35 blow mixes, additional testing shall be carried out to determine the extent of noncomplying asphalt. This asphalt shall be removed and replaced at the Contractor's expense.

245.31 THICKNESS

1. The nominal thickness of asphalt to be laid shall be specified by the Superintendent. Thickness of the asphalt shall be judged on one of three quality levels:

Thickness of Asphalt

- Conformance
- Conditional Conformance
- Non-Conformance

2. When tested for thickness any test lot of a minimum six (6) core samples shall be deemed to be conforming if the mean core thickness is greater than the minimum specified thickness less 15% or less than the minimum specified thickness plus 20%, nett of corrective courses.

Conformance

3. Should the mean core thickness be less than the nominal thickness specified by greater than 15% the conditional conformance payment factor shall apply as detailed in Table 245.8.

Conditional Conformance

4. Should any 1 of the 6 core samples be less than the nominal thickness specified by greater than 20% then additional cores may be taken at the Contractor's expense to establish that an area of thin pavement exists.

5. Cores shall be taken at locations halfway between existing random cores and/or additional thickness determining cores to determine the extent of the thin pavement. The non-conformance payment factor for that area may apply as detailed in Table 245.8. Alternatively, the Contractor may arrange, at the Contractor's expense, to have

Non-Conformance

the area of thin pavement overlaid or removed and replaced with fresh asphalt and retested. Removal shall be carried out so as not do damage the underlying layers or any road fixtures, such as gully gratings. Any such damage shall be repaired at the Contractor's expense.

6. The mean core thickness of asphalt laid shall not exceed the nominal specified thickness by greater than 20% net of corrective courses. The Principal shall only pay for the proportion of mix necessary to achieve nominal thickness plus 20%.

***Council Pay
on Minimum
Plus 20%***

7. Where it is necessary to overlay or remove and replace asphalt, the nominal overlay or layer thickness shall not be less than 20mm. The Principal will only pay for the proportion of asphalt necessary to achieve the specified nominal thickness.

245.32 SHAPE

1. Where the base pavement conforms with the appropriate standard, the shape shall conform to the values for freeways and highways as detailed in Table 9.1 of AS 2734 – Asphalt (Hot-mixed) Paving – Guide to Good Practice.

***Shape
Requirement***

245.33 REJECTION OF WORK

1. The Superintendent reserves the right to reject any asphalt laid that does not conform to the requirements of this Specification. As an alternative to a payment penalty, the Superintendent reserves the right to have the asphalt removed and replaced at the Contractor's cost.

***Rejection of
Work***

SPECIAL REQUIREMENTS

245.34 RESERVED

245.35 RESERVED

245.36 RESERVED

245.37 RESERVED

LIMITS AND TOLERANCES

245.38 SUMMARY OF LIMITS AND TOLERANCES

1. Refer to relevant Australian Standards and Main Roads WA Standards.

MEASUREMENT AND PAYMENT

245.39 DEDUCTIONS

1. A section of work on which either the asphalt and/or placing work fails to conform to this Specification may be accepted at the absolute discretion of the Superintendent subject to conditional conformance as defined in this Specification and the provisions listed hereunder.

(a) Density

The pay factors due to density of asphalt laid are derived from the results of Marshall Density Tests. The tolerances applicable are given in Table 245.6.

Characteristic Percent Marshall Density	Quality Level	Pay Factor
Rct equal to or greater than Rc	Conformance	1.0
Rct less than Rc and greater or equal to Rc - 3%	Conditional Conformance	1 - 0.1(Rc - Rct)
Rct less than Rc - 3%	Non-conformance	0.0

TABLE 245.5 - Pay Factors for Density

(b) Voids

Table 245.7 contains a range of Asphaltic Mat Voids(AMV) values against the quality levels and their corresponding pay factors.

Where: AMV is the asphaltic mat voids in the asphalt.

Total Voids	Quality Level	Pay Factor
10.0 > AMV > 2.5 (35 blow) 10.0 > AMV > 3.5 (50 blow) 11.0 > AMV > 3.5 (75 blow)	Conformance	1.000
12.0 > AMV > 10.0 (35 & 50 blow)	Conditional Conformance	35 & 50 blow AMV(-0.15) + 2.5
12.0 > AMV > 11.0 (75 blow)	Conditional Conformance	75 blow AMV(-0.30) + 4.3
AMV > 12.0	Non-Conformance	0.000
2.5 > AMV (35 blow) 3.5 > AMV (50 & 75 blow)	Non-Conformance	0.000

TABLE 245.6 - Pay Factors for Voids

(c) Thickness

The Superintendent shall reject any asphalt laid having an average thickness of less than 80% of the required thickness. A range of pay factors against average asphalt thickness are listed in Table 245.8.

AT: The average thickness of the results of a six (6) core test lot reported to the nearest millimetre.

NT: The nominal thickness specified by the Superintendent or as shown on the approved Drawings.

Average Thickness Range	Quality Level	Pay Factor
1.2 NT > AT > 0.85 NT	Conformance	1.000
0.85 > AT > 0.8 NT	Conditional Conformance	$\frac{AT}{0.85 NT}$
AT > 1.2 NT	Conditional Conformance	$\frac{1.2 NT}{AT}$
0.8 NT > AT	Non-Conformance	0.000

TABLE 245.7 - Pay Factors for Thickness

245.40 PAY ITEMS

1. Payment shall be made for all activities associated with completing the work detailed under this Specification in accordance with Pay Items 245(a) to 245(d) inclusive.
2. A lump sum price for any of these items shall not be accepted.
3. If any item for which a quantity of work is listed in the Schedule of Rates has not been priced by the Contractor, it shall be understood that due allowance has been made in the prices of other items for the cost of the activity which has not been priced.
4. Where "provisional" items are shown in the schedule, these may not be required during the course of the work as the requirement may be governed by site or external constraints.
5. Provision for traffic shall be measured and paid in accordance with the Specification for CONTROL OF TRAFFIC.
6. Payment shall be made on the basis of the actual mass of asphalt used unless the pavement is considered a conditional conformance or non-conformance pavement where a proportional factor shall apply. The final payment factor shall be the worst individual or lowest of all payment factors. All payment factors shall be taken to three (3) decimal places.
7. Payment shall be paid at the rate for the total tonnes laid in any one day, or on a large project, at the rate applicable for the total tonnage on the project.

Pay Item 245(a) SUPPLY AND APPLICATION OF TACK COAT (INCLUDING PREPARATION OF SURFACE)

1. The unit of measurement shall be the litre.
2. The quantity shall be determined by multiplying the nominated application rate of bitumen emulsion (in litres per square metre) by the authorised area of road surface tack coated or other method approved by the Superintendent.

ASPHALTIC CONCRETE

- No account shall be taken of area of tack coat applied to faces of joints, kerbs and other structures.
- The schedule rate under this item shall include all operations involved in the supply and application of the tack coat, including surface preparation and provision of a blinded surface where determined by the Superintendent.

Pay Item 245(b) DENSE GRADED ASPHALT IN HIGHWAYS, ARTERIAL, INDUSTRIAL AND DISTRIBUTOR ROADS

245(b)(1)	10mm Nominal Size	AC10
245(b)(2)	14mm Nominal Size	AC14
245(b)(3)	20mm Nominal Size	AC20

- The unit of measurement shall be tonnes confirmed by weighbridge docketts.
- The schedule rate under this item shall include all operations involved in the supply, spreading and compaction of the asphalt.
- A separate unit rate shall be included in the Schedule of Rates for each nominal size of asphalt specified.

Pay Item 245(c) DENSE GRADED ASPHALT IN RESIDENTIAL STREETS / CUL DE SACS

245(d)(1)	7mm Nominal Size	AC7
245(d)(2)	10mm Nominal Size	RAC10
245(d)(3)	14mm Nominal Size	RAC14

- The unit of measurement shall be tonnes confirmed by weighbridge docketts.
- The schedule rate under this item shall include all operations involved in the supply, spreading and compaction of the asphalt.
- A separate unit rate shall be included in the Schedule of Rates for each nominal size of asphalt specified.

Pay Item 245(d) DENSE GRADED ASPHALT IN RECREATIONAL AREAS

245(e)(1)	5mm Nominal Size	AC5
245(e)(2)	7mm Nominal Size	AC7

- The unit of measurement shall be tonnes confirmed by weighbridge docketts.
- The schedule rate under this item shall include all operations involved in the supply, spreading and compaction of the asphalt.
- A separate unit rate shall be included in the Schedule of Rates for each nominal size of asphalt specified.

ASPHALT AND BINDER TYPES

1. Nominal sizes of asphalt required for this contract (tick box) and enter binder and aggregate type:

AC Type	Nominated Compactive Effort	Binder Type	Aggregate Type
AC5	35 blow <input type="checkbox"/>	
	50 blow <input type="checkbox"/>	
AC7	35 blow <input type="checkbox"/>	
	50 blow <input type="checkbox"/>	
AC10	50 blow <input type="checkbox"/>	
	75 blow <input type="checkbox"/>	
AC14	50 blow <input type="checkbox"/>	
	75 blow <input type="checkbox"/>	
AC20	50 blow <input type="checkbox"/>	
	75 blow <input type="checkbox"/>	
RAC10	35 blow <input type="checkbox"/>	
	50 blow <input type="checkbox"/>	
RAC14	35 blow <input type="checkbox"/>	
	50 blow <input type="checkbox"/>	

Binder Types: Class 170 A3L
 Class 320 A3R

Aggregate Types: Granite G
 Diorite D

2. Specific Sampling and Testing Requirements shall apply to the mixes annotated by an asterisk (*) in the above tabulation.
 Testing Frequency: _____ Referee Sampling Frequency _____ (eg 1/50T)

3. Nomination of aggregate pretreatment procedure if required by Superintendent:

4. Special aggregate mixes required for this contract: (Nominate Source)
