



SPECIFICATION 506

ENRICHMENT SEALS

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REVISION REGISTER			
Clause Number	Description of Revision	Authorised By	Issue Date
Whole document	Reformatted	SCO	23/05/2017
506.02	Out dated or documents not required removed	PSM	20/05/2009
506.03	Moved to 506.32		
506.06	Changed to type CRS/170-60 emulsion		
506.28	Deleted		
506.31	Updated		
506.32	Inserted timing of final spray		
Annexure	Deleted Annexure 506C		
Whole document	Complete revision of Issue 2.2 to new format	MCP	01/08/2006

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SPECIFICATION 506

ENRICHMENT SEALS

GENERAL

506.01 SCOPE

1. The work under this specification consists of the supply and spray of diluted rapid setting cationic emulsion enrichment seals to the locations and lengths shown in the Locality Plan and Schedule of Works given in Annexure 506A.
2. The Works shall include, but shall not be restricted to:
 - a. supply, transportation and storage of bitumen emulsion;
 - b. supply and blending of dilution water;
 - c. preparation of pavement surface where required;
 - d. application of diluted emulsion to the pavement surface;
 - e. application of cover aggregate where required;
 - f. clean-up of the Site.

***Schedule of
Works***

506.02 REFERENCES

1. Australian Standards, MAIN ROADS Western Australia Standards and MAIN ROADS Western Australia Test Methods are referred to in abbreviated form (e.g. AS 1234, MRS 67-08-43 or WA 123). For convenience, the full titles are given below:

Australian Standards

- AS 1160 Bituminous Emulsions for the Construction and Maintenance of Pavements
- AS 1726 Geotechnical Site Investigations
- AS 2008 Residual Bitumen for Pavements
- AS 2341 Methods of Testing Bitumen and related road making products

Other Standards and Publications

- AUSTROADS Specification for Mechanical Sprayers of Bituminous Materials
- AUSTROADS Provisional Sprayed Seal Design Method Revision 2000 (AP-T09)

AUSTROADS Bitumen Sealing Safety Guide (1995)

MAIN ROADS Test Methods

MRWA 340.1 Sprayed Binder Application Rate: Carpet Tile Method

MRWA 700.1 Sampling Procedures for Bitumen and Oils

MAIN ROADS Specifications

SPECIFICATION 202 TRAFFIC

506.03 – 506.05 NOT USED

PRODUCTS AND MATERIALS

506.06 BITUMEN EMULSION

1. The bitumen emulsion shall be Type CRS/170-60 conforming to all requirements of AS 1160 except as specified hereafter.
2. The bitumen emulsion shall have a consistency less than 5.0 degrees Engler at 25°C. *Consistency*
3. The bitumen emulsion shall have a setting time of not less than 1 minute and not more than 3 minutes. *Setting Time*

506.07 COVER MATERIAL

1. Cover material used for blinding the bitumen emulsion shall be clean sand or a crushed rock material. The material shall have a nominal maximum size of not greater than 5mm and be free of dust, clay or organic matter. *Contractor Supply*
2. Where cover material is made available by the Principal, details of the material(s) are provided at Annexure 506B. *Principal Supply*

506.08 WATER

1. The Contractor shall ensure that the water to be used for dilution of the bitumen emulsion is compatible with the bitumen emulsion. *Compatibility*

506.09 BULK STORAGE SITES

1. At least 5 days prior to the establishment or use of any selected site for the storage of bulk bitumen emulsion, the Contractor shall notify the Superintendent of such intention. The Contractor shall not proceed with site establishment without prior authorisation to proceed from the Superintendent. *HOLD POINT*
2. The Contractor shall clean up and reinstate all storage sites upon vacating each site.

506.10 EMULSION DISPOSAL SITES

1. Prior to their use the Contractor shall nominate proposed sites to the Superintendent for the discharge and/or disposal of either diluted or undiluted bitumen emulsion.
2. Any area so used without the Superintendent's authorisation shall be made good immediately and no payment will be made for the cleaning or repair works.

HOLD POINT

506.11 – 506.25 NOT USED

EQUIPMENT

506.26 BITUMEN SPRAYER

1. The bitumen emulsion shall be applied using a bulk bitumen sprayer complying with the relevant sections of the "Specification for Mechanical Sprayers of Bituminous Materials" issued by AUSTROADS". In addition, the spray bar shall be of the fully circulating type.
2. The sprayer shall have been tested for uniformity of transverse distribution and calibrated for overall application rates. The tests shall have been performed within 12 months prior to use of the sprayer in the Works up to spray rates at least 15% higher than specified herein.
3. **The certificate and charts applying to the testing of the sprayer shall be made available to the Superintendent prior to use of the sprayer at the Site.**
4. The Contractor shall have available Copley EA Main Roads edge nozzles or approved equivalent for use in spraying inner or outer edges. The remainder of the spray bar shall be fitted with Copley AN184 or AN9 (formerly S2) nozzles or approved equivalents.

Sprayer Type

Testing

HOLD POINT

506.27 MECHANICAL CONDITION

1. All plant and equipment used in the Works shall be in a sound mechanical and roadworthy condition, and free from fuel, oil and coolant leaks which may damage the bitumen surface. All equipment shall be refuelled off the sealed surface to avoid the risk of spillages. In the event of any such leaks or spillages onto the bitumen surface, the Contractor shall correct the damage to the satisfaction of the Superintendent at no cost to the Principal.

506.28 – 506.30 NOT USED

PROVISION FOR TRAFFIC

506.31 GENERAL

1. The Contractor shall supply, erect, maintain and remove all signs and other traffic control devices and personnel necessary for the safe conduct of traffic through the Worksite and for the protection of the Works and workers, all in accordance with Specification 202 TRAFFIC.

Traffic

Management

- | | |
|--|----------------------------|
| 2. At least two persons shall be employed on a full time basis as traffic controllers. Warning signs shall always be erected in conjunction with the use of traffic controllers. Each traffic controller shall be equipped with a portable two-way radio, plus a spare, and wear high visibility clothing. | Traffic Controllers |
| 3. Proposals to impose temporary speed restrictions, must be notified to the Superintendent prior to their implementation. | HOLD POINT |
| 4. The Contractor shall minimise traffic delays and ensure that all operations are carried out with minimum inconvenience to the travelling public. | |
| 5. Signs and devices shall be regularly cleaned and maintained to ensure that they are clearly visible to traffic at all times. | Sign Maintenance |

506.32 OPENING OF ROAD TO TRAFFIC

- | | |
|---|------------------------------|
| 1. Traffic shall not be allowed on the new work until the emulsion has broken and fully cured and the sprayed surface is able to withstand the action of traffic without picking-up of material. Where required, or where ordered by the Superintendent, ponding and excess binder shall be covered in accordance with Clause 506.44. | Curing of Emulsion |
| 2. The Contractor shall be responsible for the cleaning of any vehicles resulting from noncompliance with this Clause. | Damage to Vehicles |
| 3. All spraying is to be completed no later than 3:00 pm. This is to ensure that there is sufficient time after spraying and before sunset for the emulsion to penetrate the pavement and break before traffic is permitted on the newly sprayed works. | Timing of Final Spray |

506.33 FAILURE TO COMPLY

1. If within a reasonable time of receiving a request from the Superintendent to carry out the above requirements the Contractor fails to comply with these requirements, the Superintendent may take whatever steps he considers necessary to properly provide for the safety and/or convenience of traffic and the cleaning of any vehicles, including the hiring of plant and the employment of labour, and the cost of all such provision shall be charged to the Contractor, or shall be deducted from any payment due to the Contractor.

506.34 – 506.40 NOT USED

APPLICATION

506.41 GENERAL

1. The bitumen emulsion shall be applied to the existing bitumen surface, prepared as required, in accordance with the details provided in the Schedule of Works at Annexure 506A.

506.42 SURFACE PREPARATION

1. The Contractor shall carry out preparation of the existing bitumen surface by sweeping off all loose material on the existing surface prior to spraying.

Cleaning

506.43 DILUTION

1. The bitumen emulsion shall be diluted with water in the ratio 4:1 bitumen emulsion: water. The Contractor shall supply the water for dilution.
2. Where dilution is carried out in a bulk tanker, the tanker load shall be circulated for 20 minutes after dilution and immediately prior to filling the sprayer. A further 5 minutes circulation shall be carried out in the sprayer immediately before spraying the emulsion.
3. Where the dilution is carried out in the sprayer each sprayer load shall be circulated for 15 minutes after dilution and immediately before spraying the emulsion.

Dilution Ratio

Circulation

506.44 APPLICATION

1. Application shall take place only when the pavement temperature is between 15°C and 45°C. Binder shall not be applied if there is excessive wind or if rain is imminent.
2. No setting out marks will be provided but the Contractor shall uniformly cover the pavement at the rates specified or ordered. The provisional application rates are detailed in Annexure 506A. Any changes to these application rates will be provided by the Superintendent on the day of spraying.
3. Application rates shall be within 0.1 litres/m² of those ordered. Any section under sprayed by more than 0.1 litres/m² shall be resprayed in order to achieve the specified application rate. Where the total application rate is more than 0.1 litres/m² greater than the ordered application rate, cover material, as specified in Clause 506.07, will be applied if so directed by the Superintendent.
4. Half width spraying will be required on all two lane roads. The maximum length of an individual spray run shall be 2000 metres. The Superintendent may direct that a lesser maximum length shall apply due to road alignment and traffic constraints.
5. Cover material as specified in Clause 506.07 shall be spread over any areas of excess or ponding of binder, sufficient to blind the bitumen and prevent pickup of material by traffic.
6. Trial strips not exceeding 100 metres in length may be necessary to verify the application rates. Extra overlapping at the road centre and the closing of alternative nozzles in wheel tracks may be required.

Weather

Spray Rate

Spray Tolerance

Spraying Length

Blinding

Trial Strips

506.45 WORKS RECORDS

1. The Contractor shall accurately record the information required on forms similar to those shown at Annexure 506C.

Forms

2. Completed forms shall be submitted to the Superintendent for each day's work at the end of the day.

506.46 – 506.80 NOT USED

AS BUILT AND HANDOVER REQUIREMENTS

506.81 – 506.90 NOT USED

CONTRACT SPECIFIC REQUIREMENTS

506.91 – 506.99 NOT USED

ANNEXURE 506A

SCHEDULE OF WORKS

Section		Length (m)	Width (m)	Area (m ²)	Binder Application Rate (litres/m ²)	Volume of Undiluted Emulsion (litres)
From	To					

(Insert appropriate details of all required enrichments.
Supplement with drawings, diagrams, etc where necessary)

ANNEXURE 506B

COVER MATERIAL SUPPLIED BY PRINCIPAL

Cover material used for blinding bitumen emulsion in case of over spraying, shall be made available to the Contractor free of charge at the location (s) shown below :

Location	Cover Material Type

ANNEXURE 506C

WORK RECORDS

1. Bituminous Surfacing - Contractors Daily Record
2. Bituminous Surfacing - Contractors Spraying Loading Record

MAIN ROADS Western Australia

BITUMINOUS SURFACING - CONTRACTORS RECORD

*** Description Of Component No. 1**

Remarks:

Component No. 2

Component No. 3

Component No. 3

SIGNATURE CONTRACTORS REPRESENTATIVE:

**** = Tick Appropriate Box**

SUPERINTENDENT:

MAIN ROADS Western Australia

BITUMINOUS SURFACING
CONTRACTORS SPRAYING LOADING RECORD

DATE : _____ / _____ / _____

GRADE OF BITUMEN : _____ ROAD : _____ SPRAY LOAD No : _____

TYPE OF BLEND : _____ SPRAY RUN NUMBERS : _____ CONTRACT No : _____

A. LOADING INTO EMPTY SPRAYER

1 Pavement Temp	_____ °C	Design Blend	_____ / _____ / _____
2 Application Rate (Hot)	_____ L/M ²	Spray Temp (Hot)	_____ °C
3 Volume Required In Sprayer	_____ L @ _____ °C		
	_____ L @ 15°C		
4 Components To Be Added	(15°C)		
Component 1	_____ L	OR	_____ L @ _____ °C
Component 2	_____ L	OR	_____ L @ _____ °C
Component 3	_____ L	OR	_____ L @ _____ °C
Adhesion Agent	_____ L		

B. LOADING INTO SPRAYER CONTAINING PRIMER

1 Pavement Temp	_____ °C	Design Blend	_____ / _____ / _____
2 Application Rate (Hot)	_____ L/M ²	Spray Temp (Hot)	_____ °C
3 Volume Required In Sprayer	_____ L @ _____ °C		
	_____ L @ 15°C		
4 Components To Be Added	(15°C)		
Component 1	_____ L	OR	_____ L @ _____ °C
Component 2	_____ L	OR	_____ L @ _____ °C
Component 3	_____ L	OR	_____ L @ _____ °C
5 Primer Remaining In Sprayer	_____ L	_____ °C	_____ L @ 15°C
6 Actual Primer Composition	_____ / _____ / _____		
7 Components Remaining in Sprayer			
Component 1	_____ L	Component 3	_____ L
Component 3	_____ L		
8 Components To Be Added	(15°C)		
Component 1	_____ L	OR	_____ L @ _____ °C
Component 2	_____ L	OR	_____ L @ _____ °C

ACTUAL COMPONENTS ADDED

A		B	
Component 1	_____ L @ _____ °C	Component 1	_____ L @ _____ °C
Component 2	_____ L @ _____ °C	Component 1	_____ L @ _____ °C
Component 3	_____ L @ _____ °C	Component 1	_____ L @ _____ °C
Adhesion Agent	_____ L	Adhesion Agent	_____ L
Actual Blend	_____ / _____ / _____	Actual Blend	_____ / _____ / _____

SIGNATURES :

Contractor's Rep

Superintendent

Component 3 _____ L **OR** _____ L @ _____ °C
Adhesion Agents _____ L

1 _____

Description of 2 _____

Components 3 _____

GUIDANCE NOTES

FOR REFERENCE ONLY – DELETE GUIDANCE NOTES FROM FINAL DOCUMENT

1. All edits to downloaded Specifications shall be made using *Track Changes*, to clearly show added/deleted text.
 2. If **all** information relating to a clause is deleted, the clause number should be retained and the words “**NOT USED**” should be inserted.
 3. The proposed documents with tracked changes shall be submitted to the Project Manager for review, prior to printing the final batch of documents. When this final printing is carried out, the tracked changes option is to be turned off.
 4. Before printing accept all changes in the document, turn off *Track Changes* and refresh the Table of Contents.
 5. The Custodian of this specification is Pavements and Surfacing Manager.
-

CONTRACT SPECIFIC REQUIREMENTS

The following clauses are to be placed under the CONTRACT SPECIFIC REQUIREMENTS, as required. After inserting the clause, change the clause number and heading to style "H2 SP" so it appears in the Table of Contents.

XXX.XX SUB HEADING (H2 SP)

1. Insert text (Main Table SP) **Keyword SP**

2. Insert text (Main Table SP)

XXX.XX SUB HEADING (H2 SP)

1. Insert text (Main Table SP)

2. Insert text (Main Table SP)

AMENDMENT CHECKLIST

Specification No. **506** Title: **ENRICHMENT SEALS**

Revision No: _____

Project Manager: _____

Signature: _____

Date: _____

Checked by: _____

Signature: _____

Date: _____

Contract No: _____

Contract Description: _____

ITEM	DESCRIPTION	SIGN OFF
<i>Note: All changes/amendments must be shown in Tracked Changes mode until approved.</i>		
1.	Project Manager has reviewed Specification and identified Additions and Amendments.	
2.	CONTRACT SPECIFIC REQUIREMENTS addressed? Contract specific materials, products, clauses added? (Refer Specification Guidance Notes for guidance).	
3.	Any unlisted materials/products proposed and approved by the Project Manager? If "Yes" provide details at 16.	
4.	Standard clauses amended? MUST SEEK approval from Manager Commercial.	
5.	Clause deletes shows as " NOT USED ".	
6.	Appropriate INSPECTION AND TESTING parameters included in Spec 201 (Text Methods, Minimum Testing Frequencies verified).	
7.	ANNEXURES completed (refer Specification Guidance Notes).	
8.	HANOVER and AS BUILT requirements addressed.	
9.	Main Roads QS has approved changes to SMM .	
10.	Project Manager certifies completed Specification reflects intent of the design.	
11.	Completed Specification – independent verification arranged by Project Manager.	
12.	Project Manager's review completed.	
13.	SPECIFICATION GUIDANCE NOTES deleted.	
14.	TABLE OF CONTENTS updated.	
15.	FOOTER updated with Document No., Contract No. and Contract Name.	
16.	Supporting information prepared and submitted to Project Manager.	
Further action necessary:		

Signed: _____ (*Project Manager*) Date: _____