DELIVERING FOR QUEENSLAND

Applicant's guide

Registration of Bituminous Emulsions for Priming Pavement Surfaces

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Queensland Government

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Feedback

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1 Introduction

This document outlines the Department of Transport and Main Roads process for assessing and registering bituminous emulsions used for priming road pavement surfaces on infrastructure projects.

This document is maintained by the Pavements, Research and Innovation Section within the department's Engineering and Technology Branch. Enquiries about this document should be emailed to tmrroadsurfacings@tmr.qld.gov.au.

2 Priming pavements

2.1 Function of a prime

The function of a prime in flexible pavement construction is to penetrate and bind the top surface of unbound, lightly bound, and heavily bound pavements in preparation for placement of a sprayed bituminous treatment (i.e. sprayed seal) or asphalt.

Transport and Main Roads has traditionally used cutback bitumen (which is a mixture of bitumen and cutter oil) to prime pavement surfaces. These materials can be relatively slow to cure (particularly in cool and/or damp weather conditions), which in some cases has the potential to delay the construction process and lead to increased costs and road user delays. In situations where shorter curing times are required, bituminous emulsion primes may be a viable alternative.

One of the major benefits with bituminous emulsion primes is that they will typically cure within one day of placement, which is significantly less than the 3 days typically required for cutback bitumen primes to cure.

2.2 Bituminous emulsions used in priming

Bituminous emulsions used in priming applications are proprietary products which do not conform with any of the standard grades listed in AS 1160 *Bituminous emulsions for the construction and maintenance of pavements* or MRTS21 *Bituminous Emulsion*.

3 Overview of Registration System

3.1 General

Transport and Main Roads will maintain a registered products list of bituminous emulsions that can be used to prime pavement surfaces on its website www.tmr.qld.gov.au via the Pavements, materials and geotechnical page.

3.2 Submissions

Manufacturers who would like to have their product(s) registered for use on departmental projects should apply to tmrroadsurfacings@tmr.qld.gov.au. The information that must be included in their submission is detailed in Sections 3.3, 3.4 and 3.5 of this document.

3.3 Evaluation

Products are evaluated against:

- the functional requirements outlined in Section 2.1
- test property requirements specified in Section 5, and
- evidence of successful usage on projects, as outlined in Section 6.

3.4 Information pack requirements

The manufacturer must prepare an information pack, which will enable the successful installation of their product on departmental projects. The information pack must comply with the requirements outlined in Appendix A.

Manufacturers must make copies of the information pack available to Contractors and Contract Administrators who are using the product on departmental projects, upon request.

3.5 Manufacturer requirements

Manufacturers must operate an accredited quality system (AS/NZS ISO 9001 *Quality management systems – Requirements*) for the manufacture of the product.

3.6 Product registration

Products determined by Transport and Main Roads to be suitable for registration, which include having an appropriately documented information pack (refer Section 3.4) and being manufactured by an organisation complying with the requirements of Section 3.5 will be added to the department's registered products list for a nominal period of 3 years provided that:

- the information pack does not need to be changed
- product (chemical) composition / formulation does not change, and
- ongoing satisfactory performance is maintained.

Transport and Main Roads may also place conditions on the registration of a product.

Should the product's composition change or the information pack is updated, a new application will be required.

The registration status of a product may be reassessed at any time when additional information is submitted to tmrroadsurfacings@tmr.qld.gov.au for consideration. This information may be submitted by the product manufacturer, Contractors, Contract Administrators, and Transport and Main Roads personnel who have experience with using the product on departmental projects.

3.7 Registration levels

Product registration is assigned at a specific level based on the number of documented field trials / projects that have been undertaken using the product.

Table 3.7 – Levels of product registration for bituminous emulsion used for priming pavement surfaces

Product registration level	Indicative description of experience
1	At least 3 documented field trials have been undertaken for each type of suitable pavement material[1].
2	At least one documented field trial has been undertaken for each type of suitable pavement material[1].
3	Documented field trials have yet to be undertaken.

[1] Standard pavement material types are as follows:
a) MRTS05 *Unbound Pavements* or equivalent (using Type 1, Type 2 and/or Type 3 quality materials)
b) MRTS07B *Insitu Stabilised Pavements using Cement or Cementitious Blends* or
c) MRTS08 *Plant-Mixed Heavily Bound (Cemented) Pavements* or equivalent, or
d) MRTS10 *Plant-Mixed Lightly Bound Pavements* or equivalent.

Type 4 unbound pavement materials must be assessed on a case-by-case basis and are not part of the scope for registration.

3.8 Registration fees

Application fees are payable for the assessment of each emulsion prime product submitted for registration. The application fee is given in Table 3.8 and application fees shall be paid upfront by the Applicant and are payable regardless of the outcome of the assessment (i.e. payable regardless of whether the product is registered or not).

Details of payment can be provided by the department at the time of submission of application.

Table 3.8 – Application fee

Application details	Application fee (excluding GST)
Each emulsion prime product	$550

4 Transport and Main Roads registered product list

4.1 Product registration

The Transport and Main Roads registered product list of bituminous emulsions that can be used to prime pavement surfaces will be publicly available on the department's website.

The list will be updated regularly and includes the following details:

- name of product and manufacturer
- contact details for the manufacturer
- pavement material types that are suitable and not suitable for priming with the product
- sprayed bituminous treatment types that can and cannot be applied over the primed pavement surface
- date of registration
- date of registration expiry
- level of registration, and
- any conditions associated with the product's registration.

To maintain the accuracy of the registered products list, manufacturers shall promptly notify tmrroadsurfacings@tmr.qld.gov.au of any changes to contact details or the product.

4.2 Product deregistration

If there are issues with a registered product (e.g. it is found to be underperforming or not meeting the specifications provided by the manufacturer), its conditions of use may be revised, or the product may be deregistered.

4.3 Appeals

Where conditions are placed on a product or a product is deregistered, the manufacturer has the right to appeal this decision. A manufacturer may appeal by making a written submission within 10 business days of being formally notified of the decision.

Appeals, with supporting documentation, are to be addressed to the Engineering Manager (Sprayed Seals and Binders) at tmrroadsurfacings@tmr.qld.gov.au.

Deregistration or conditional registration will be suspended for the duration of the appeals process until a decision is made.

The manufacturer of a registered product may believe an error in decision has occurred and they then can request that the decision be reviewed. The review process is generally independent from the original decision-maker, once it gets above a simple query about the decision.

The Chief Engineer or their representative may review an appeal or set up a panel to review an appeal. Appeal panels comprise the Chief Engineer or their nominee as chair, a technical expert who is a Registered Professional Engineer Queensland (RPEQ) with at least 5 years' experience in the relevant field, and potentially one other person, particularly in instances where it is for deregistration. This 'other person' is often a departmental legal representative.

Appeals processes will be assessed on the validity of the decision made for the evidence at hand, at the time the decision was made. They may also consider the appropriateness of the level of action taken and consider any new evidence presented by the appellant, and whether it is appropriate to make a recommendation for a change to the action to be taken. (A change may be an action at a higher or lower level when compared to the original decision.)

The appeals process will not consider any appeal for hardship or other circumstances related to the effect the decision may have on the appellant, only whether the decision was correct and appropriate. However, claims for hardship, mitigation, or otherwise making a case for a change to the level of action may be considered by the Chief Engineer separately from an appeals process.

5 Test properties

Testing of bituminous emulsions must be undertaken by a NATA-accredited laboratory or overseas laboratory that has accreditation with a body that has mutual recognition with NATA, and the results must not be more than 12 months old.

The manufacturer must provide test results for each property listed in Table 5 to demonstrate the product complies with the specified requirements. They must also nominate minimum and maximum limits, specific to their product, for water content, non-aqueous volatiles content, and pH, listed in Table 5.

Table 5 – Test properties for bituminous emulsions

Test Property	Test Method	Unit of Measurement	Limit
Viscosity at 25°C	AS 2341.4	Pa.s	≤ 0.03
Sieve residue, 150 µm sieve	AS 2341.26	%	≤ 0.15
Residue from evaporation	AS/NZS 2341.30	%	≥ 18
Emulsion residue, softening point	AS 2341.30 and AS 2341.18	°C	≥ 40
Non-aqueous volatiles content	AS/NZS 2341.24	%	≤ 15
pH at 25°C	AS 2341.32	–	To be nominated

6 Assessment of nominated field sites

Applicants are to complete Appendix A. The details to be provided include information about the product manufacturer, material properties, pavement surface requirements for placement, and construction procedures for the product.

Applicants shall provide details for each of the nominated field trial sites using the template in Appendix B. The field trial information should include location of application, application rates, pavement material type, weather conditions, and any ongoing performance observations of the emulsion prime. Where possible, Applicants are to include photographs of the condition of the pavement prior to and after application of the emulsion prime and any subsequent data (including photographs) with respect to curing of the emulsion prime.

Appendix A: Application form for product registration

Application form for product registration	
Product manufacturer	**Details**
Product name (and any other name(s) commonly used to refer to it)	
Legal entity name (not trading name)	
Australian Business Number (ABN)	
Business address	
Contact details for manufacturer Business phone number Business email	
AS/NZS ISO 9001 accreditation number (copy of certificate to be supplied)	
Product properties	**Details**
Type of bitumen emulsion (i.e. cationic, anionic, or non-ionic)	
Manufacturing location(s) for each product	
Product storage, transportation, and handling procedures	
Shelf-life for each material	
Australian safety data sheet (copy of data sheet to be supplied)	

Application form for product registration	
Product specific test property limits: • viscosity at 25°C • bitumen content • water content • non-aqueous volatiles content • pH (NATA certificate ≤12 months old to be supplied)	
Pavement surface requirements	**Details** (Attach additional pages as required)
Pavement material types that can be satisfactorily primed with the product e.g. MRTS05 *Unbound Pavements* (Type 1.1 and 2.1) MRTS10 *Plant-Mixed Lightly Bound Pavements*	
Pavement material types or geology that cannot be satisfactorily primed with the product e.g. MRTS08 *Plant-Mixed Heavily Bound (Cemented) Pavements*; pavement materials containing limestone aggregate	
Pavement surface preparation requirements prior to priming the pavement (include photos of suitable / unsuitable surfaces)	

Application form for product registration	
Construction Procedure	**Details**
Bituminous treatments that can be applied over the primed pavement surface and adequate bonding can be achieved e.g. DGA, sprayed seals containing C170 bitumen	
Method to determine an appropriate application rate for priming the pavement surface e.g. small-scale trial – include photos of suitable / unsuitable primed pavement surfaces	
Procedures for heating, storing, transferring, and transporting the product	
Weather conditions that are suitable for spraying and curing of the prime e.g. temperature, humidity, and wind speed	
Minimum and maximum temperature requirements for spraying the product	
Minimum temperature of the pavement surface to which the prime can be applied	

Application form for product registration	
Aftercare requirements for the primed pavement surface e.g. trafficking constraints for construction traffic	
Procedure for determining when the primed pavement surface has cured (include photos to illustrate)	
Typical curing time and detail how this might vary because of different weather conditions, or pavement material types (attach extra information if required)	

NOTES:

- A separate form is required for each trial site
- Trials should be no more than 12 months old, and
- Transport and Main Roads needs to be advised if the product (chemical) composition has changed.

Appendix B: Field trial submission details

Field trial submission details		Trial number
No.	**Item**	**Details**
1	Product name	
2	Prime application rate	
3	Location: • Locality • Road name • Road number • Chainages • Transport and Main Roads district (if relevant) • Local authority	
4	Transport and Main Roads contract number (if applicable)	
5	Date of priming	
6	Priming Contractor	
7	Contract Administrator • name • mobile • email	

Field trial submission details		Trial number
No.	**Item**	**Details**
8	Pavement material • source • geology • type • cement / lime content	
9	Details of pavement surface preparation undertaken prior to priming	
10	Photographs of pavement surface (refer to attachments) • shortly before priming • shortly after priming • shortly after the end of the curing period (timing to be noted)	
11	Weather conditions during priming (e.g. overcast / sunny) • pavement temperature • humidity • wind speed	
12	Weather conditions during curing e.g. overcast / sunny	

Field trial submission details		Trial number
No.	**Item**	**Details**
13	Time taken for prime to: • penetrate pavement surface (minutes) • cure (hours)	
14	Time between curing and next bituminous treatment (hours)	
15	Details of bituminous treatment that was applied to primed surface (as well as any additional overlying pavement layers)	
16	Performance observations following construction of overlying bituminous treatment and opening to traffic (include photos of the completed works and details of any bonding issues observed between the sprayed bituminous treatment and underlying pavement)	

NOTES

- A separate form is required for each trial site
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