

# Transport and Handling of Polymer Modified Binders

pavement work tips - No 55

March 2015

## INTRODUCTION

Guidelines for the transport and handling of Polymer Modified Binders (PMBs) are included in the *AAPA Guide to Manufacture, Storage and Handling of Polymer Modified Binders*. This pavement work tip is a summary of particular issues related to the transport and handling of PMBs.

## SAFETY

PMBs are transported and applied hot. General safety and handling procedures that are applicable to hot bituminous materials also apply to PMBs and are described in detail in the *Austrroads Bituminous Materials Safety Guide*.

All vehicles and first aid kits associated with hot bituminous materials should carry copies of the AAPA 'Bitumen Burns Card'. This card, endorsed by the Australian and New Zealand Burn Association, contains essential first aid information and should be attached to any casualty being taken for treatment for bitumen burns, for advice to medical personnel.

## TRANSPORT AND HANDLING OF PMBs

In addition to the general handling and safety procedures applicable to all bituminous materials, attention should also be paid to those issues that can cause a reduction in the quality and effectiveness of PMBs. These include the:

- Effect of excessive temperatures, extended periods of storage at elevated temperatures, and/or multiple reheating cycles.
- Possible contamination during change of product in transportation vehicles and storage tanks.
- Possible contamination with materials used for cleaning and flushing supply lines.
- Potential for some PMB mixtures to segregate in storage.

To confirm that PMBs have not suffered undue deterioration during transport, samples may be required of the product at the point of delivery or immediately prior to use in asphalt mixtures or sprayed sealing work.

## Temperatures and Heating Procedures

PMBs should never be heated to, stored or held at temperatures or for periods greater than those recommended by the manufacturer. Where practicable, only the quantity required for immediate use should be heated to the application temperature and reheating avoided.

AAPA Advisory Note 7 provides a guide to the maximum application temperature, holding time at maximum application temperature, storage temperature and maximum time at recommended storage temperature for most of the commonly supplied bituminous binders.

Where reheating of PMBs in delivery vehicles is required due to extended transport time or distance, particular attention should be paid to:

- Compliance with all relevant safety procedures.
- Maximum temperature – At no time should temperatures exceed manufacturer's recommendation.
- Rate of heating – preferably, approximately 10°C per hour and not more than 15°C per hour.
- Circulation during heating and for at least 20 minutes after heating and before discharge.
- Continuous circulation during transport of PMBs incorporating 15% or higher crumb rubber and maintenance of minimum handling temperature.

### Key Summary

*This issue of "pavement work tips" outlines key requirements for transport and handling of PMBs as a summary of procedures described in greater detail in AAPA guidelines.*



Australroads



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## Product Changeover

Vehicles used to transport PMBs should be emptied of the previous product to the minimum practical level to minimise contamination.

Vehicles previously used for transport of bitumen emulsions should not be used for the delivery of PMB unless thoroughly cleaned. Special attention needs to be paid to the removal of any residual moisture that may result in hazardous foaming.

Risk of subsequent product contamination is particularly high when vehicles have been used to transport crumb rubber modified binder. It is recommended that such binders be transported only in dedicated tankers.

Care should also be taken to ensure that tankers that have not been in use for some time are free from condensation.

Comprehensive guidance on the procedures to follow when changing product carried within a road tanker is provided in the Austroads *Bituminous Materials Safety Guide*.

## Cleaning Materials

It is preferable to use diesel or high-flash kerosene to flush lines. The amount of cleaning material should be kept to a minimum and drained from tanks and delivery lines for separate disposal in accordance with local requirements. Cleaning materials should not be flushed into binder storage tanks or delivery vehicles except that cutter oil used for cleaning delivery lines may be drawn into bitumen sprayers where the PMB is being prepared for spraying and where an allowance is made for the quantity of cutter oil.

## Segregation

Some PMB types, particularly those modified by crumb rubber or high levels of dissolved polymer, can be susceptible to segregation in transport and storage. Users should adhere to manufacturer's guidelines where applicable.

The use of stirrers in storage tanks, belly augers and circulation in sprayers should ensure homogeneity can be maintained for PMBs that are susceptible to segregation.

## Field Sampling

Where field samples of PMB are required prior to use in sprayed sealing, they should be taken during offloading of road tankers and during transfer into bitumen sprayers prior to the addition of cutters and adhesion agents.

In the case of asphalt manufacture, a sample can be taken from the PMB storage tank or from the ring main during circulation or use.

Field samples should be taken at locations and frequencies as agreed between supplier and purchaser. All sampling should be performed in accordance with the procedures described in AGPT/T101.

Field samples should be clearly identified to provide traceability from supplier to the point of sampling. Unless otherwise specified or directed, field samples that are not required to be tested immediately should be stored in sealed containers in a secure location for a minimum period of six months, or for the duration of the contract defects liability period, whichever is the greater.

## REFERENCES

AAPA 2013, Guide to the Manufacture, Storage and Handling of Polymer Modified Binders

AAPA 2013, Guide to the Heating and Storage of Binders for Sprayed Sealing and Asphalt Manufacture, Advisory Note 7.

Austroads 2006, Method for Sampling Polymer Modified Binders, Polymers and Crumb Rubber, Austroads Test Method AGPT/T101.

Austroads 2015, Bituminous Materials Safety Guide, AP-G41-15.



**Fig 1** Field blending and transfer of crumb rubber polymer modified binder using bulk blending unit

For more information on any of the construction practices discussed in "pavement work tips", please contact either your local Austroads representative or AAPA: tel (03) 9853 3595; fax (03) 9853 3484; e-mail: info@aapa.asn.au.

A complete list of "pavement work tips" is available on the AAPA website: www.aapa.asn.au or the Austroads website: www.austroads.com.au

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This edition was prepared by members of the Austroads Bituminous Surfacing Working Group.