

## Sprayed Sealing - Cutting Back of Polymer Modified Binders

pavement work tips — no. 27

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### INTRODUCTION

This Work Tip is a summary of the Guide to Sprayed Seal Construction/Cutting Practices for PMBs produced by the Austroads PMB Project Group.

It particularly refers to practices that are different to standard Class 170 bitumen and multigrade bitumen binders. A guide to sprayed seal cutting practice for Class 170 bitumen is provided in Work Tip No. 14. Those guidelines may also be applied to multigrade bitumen.

A major difference in using PMBs (Work Tip No 6) in sprayed sealing work, compared to unmodified bitumen, is that increased binder consistency and poorer wetting characteristics make it more difficult to obtain initial aggregate adhesion. Special attention, therefore, is required to be paid to:

- ambient conditions
- condition and precoating of aggregate
- use of adhesion agents
- speed of covering and rolling
- cutting procedures.

### AMBIENT CONDITIONS

Both pavement and air temperature should be above 20°C. Particular care must be taken to avoid wind chilling, causing skinning of the surface, or any form of moisture. If conditions are marginal or doubtful, the work should be deferred until more favourable conditions apply.

Care is required in assessing pavement temperature for selection of cutter proportions, taking into account presence of shaded areas and expected weather conditions in the 24 hours or so following completion of the work. When using 8 parts or more of cutter oil, the risk associated with bleeding in subsequent periods of hot to very hot weather should also be considered.

### AGGREGATES

To maximise adhesion, aggregates should be precoated with a bitumen based precoat that contains a minimum of 1% adhesion agent. Aggregates must be clean, dry, and of good quality. A guide to precoating of aggregates is provided in Work Tip No. 23.

### ADHESION AGENTS

Adhesion agents (generally double the concentration used for unmodified bitumen) should always be added to hot PMBs used in sprayed sealing work (see also Work Tip No. 23).

### COVERING AND ROLLING

Aggregates must be promptly applied uniformly at the design rate and rolled without delay. A guide to rolling of cover aggregates is provided in Work Tip No. 24.

### CUTTING PROCEDURES

#### Type of Cutter Oil

Some PMBs, particularly highly modified types and pre-blended crumb rubber mixtures, require oils of particular compatibility or aromaticity. If in doubt, the manufacturer's requirements should be checked before using any particular cutter oil or flux oil.

#### Proportion of Cutter Oil

A guide to proportion of cutter oil for PMBs used in Strain Alleviating Membrane (SAM) and High Stress Seal (HSS) applications is provided in Table 1 (see reverse). Variations in the proportion of cutter oil may apply to PMBs used in aggregate retention and Strain Alleviating Membrane Interlayer (SAMI) applications (refer notes to table).

*continued on reverse*

#### Key Summary

*This issue of 'pavement work tips' provides a guide to the use of cutter oils in hot PMB binders used in sprayed sealing work.*



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**TABLE 1: Guide to Cutting Practice for PMBs used in SAM and HSS Applications<sup>1,2</sup>**  
(Parts by volume of cutter oil to be added to 100 parts by volume of PMB-measured at 15°C)<sup>3</sup>.

Pavement Temperature <sup>4</sup> (°C)	Traffic (veh/lane/day based on AADT)	Class of PMB				
		S15E	S20E S25E	S35E	S45R S50R <sup>5,6</sup>	S55R <sup>5,6</sup>
20 to 25	<1000	6-8	8	6	10	12
	≥1000	6	6-8	4	8	10
26 to 32	<1000	4-6	6	4	8-10	10-12
	≥1000	4	4-6	2	6-8	8-10
33 to 38	<1000	4	4-5	2	6-8	8
	≥1000	2	3-4	2	6	6-8
39 to 45	<1000	Min 2	Min 3	0-2	4-6	6
	≥1000				4-6	4-6
> 45	All	Min 2	Min 3	0-2	Min 4	Min 5

## NOTES:

- 1 In SAMI applications, where the seal is to be covered by asphalt within a short period, it is undesirable to include any cutter oil at all. If cutter oil is considered necessary, it should be a maximum of 2 parts of cutter oil to 100 parts of PMB.
- 2 In aggregate retention applications using lower levels of polymer modification ie. S10E, S40R, and some proprietary blends of PBD, the binder should be cut back as per normal Class 170 bitumen (Work Tip No. 14)
- 3 Where cutter proportions are added as percentage of total binder, the proportions shown here as parts per 100 parts of PMB may be taken as a reasonable approximation of percentage by volume.
- 4 Pavement temperature should generally be based on the worst condition, ie. shaded areas.
- 5 Pre-blended crumb rubber grades may contain process oil used in their manufacture. This oil will most likely reduce the viscosity compared to field blended grades, and may allow a small reduction, say 2 parts, in added cutter oil compared to field produced grades.
- 6 At high rates of application of binder (greater than say 2 L/m<sup>2</sup>) the proportion of cutter oil may be reduced by 2 parts.

## REFERENCES

- Work Tip No. 6 – Polymer Modified Binders  
 Work Tip No. 14 – Sprayed Seal Cutting Practice  
 Work Tip No. 23 – Sprayed sealing – Aggregate Precoating  
 Work Tip No. 24 – Sprayed sealing – Rolling of Cover Aggregate  
 Guide to Sprayed Seal Cutting Practice, APRG Document 97/09 (SU) April 1997.  
 Sprayed sealing construction/Cutting practices for PMB seals, Technical Note, Austroads 2001.  
 Framework specifications for polymer modified binders, Report No AP-T04, Austroads 2000.

For more information on any of the construction practices discussed in "pavement work tips", please contact either your local AUSTRROADS Pavement Reference Group representative or AAPA —  
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