pavement work tips

Sprayed Sealing - Selecting Aggregate Size

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INTRODUCTION

The general principles affecting aggregate size selection are:

- Type and purpose of the seal;
- Cost effectiveness

Further factors may include:

- The need for the aggregate size to mesh compatibly with the existing surface texture;
- Increased noise levels associated with larger aggregate sizes

AGGREGATE SIZES USED

Aggregate sizes ranging from sand, 5mm, 7mm, 10mm and 14mm, are commonly used in single application seals. Larger sized aggregates (e.g. 20mm) may also be used in single application seals, but more commonly restricted to use in conjunction with multiple application seals.

Key Summary

This issue of 'pavement work tips' provides a guide to selection of aggregate size for use in a range of sprayed seal treatment types.

SELECTION GUIDELINES

Table 1 lists the generally recommended aggregate sizes for a range of sealing treatments. The recommendations generally apply to roads with normal traffic patterns. A few examples of special situations are given but the list is not exhaustive. Further consideration to selection may be required where unusual alignment, traffic loadings, or need for particular surface characteristics apply.

Table 1. Generally Recommended Aggregate Sizes for Sprayed Seal Treatments

Treatment	Common sizes	Comment
Initial treatment (Primerseal) • To be resealed before opening to traffic • Under traffic	• Sand or 5 or 7mm • 7 for firm pavements and low traffic, or 10mm in all other cases	A small sized aggregate will carry construction traffic at lowest cost and avoid presenting a very coarse texture that may require additional binder when applying the final seal. The maximum size used in primersealing is 10mm due to the use of low viscosity binders.
Initial treatment (Prime and seal) • To be resealed before opening to traffic • To be opened to traffic after sealing	• Sand or 5 or 7mm • 7 or 10mm for firm pavements and low traffic • 10mm for soft pavements and low traffic • 14mm or 10mm for high traffic pavements	For low traffic roads, 7mm and 10mm sprayed seals can provide adequate service at lowest initial cost. Size 14mm sizes are initially more expensive but can be cost effective in some light traffic applications where surface enrichment is used to extend the life of the seal. (Surface enrichment may be done a number of times)
Final seal or reseal • Existing seal 7mm, or asphalt surface • Existing seal 10mm • Existing seal 14 or 16mm	• Generally 7 or 10mm for low traffic and 14mm for high traffic (but reduce to 10mm if noise is an issue) • 7mm for low traffic or 14mm for high traffic • 7mm for low traffic or 10mm for high traffic	If the existing surface texture is uneven, it may be very difficult to successfully reseal. In such cases a corrective treatment using 5 or 7mm aggregate may provide a more even surface texture which can subsequently be resealed with a larger aggregate size.

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SAM • Existing seal 7mm or an asphalt surface • Existing seal 10mm • Existing seal 14mm	• Generally 14mm • 14mm • 10mm	The choice of polymer modified binder depends upon the type of cracking – refer APRG Report 19 or Work Tips Nos. 6 & 8. SAM seals for resistance to cracking should use aggregates of 14mm size to provide a suitable heavy binder application. This may be reduced to 10mm if noise is an issue or where required to mesh with an existing coarse textured seal, but performance levels will be reduced. Alternatively, double application seals, or corrective treatments can be considered.
SAMI seals • Asphalt surface or sprayed seal surface	• Generally 10mm	Generally, a SAMI seal requires 1.6 - 2.0 L/m2 of polymer modified binder to provide sufficient binder to resist reflection cracking. Risk of flushing of a 10mm seal, at such application rates, is minimal where the seal is only trafficked for a short period before applying asphalt.
Geotextile Reinforced sprayed seals • To remain as a sprayed seal surface • To be surfaced with asphalt	• Generally 14mm • Generally 10mm	Geotextile reinforced, single application sprayed seals require high binder application rates and highly modified binder to effectively hold aggregate in place. They should not be used where subject to severe turning traffic. Risks of poor performance increase with 10mm aggregate although the smaller size is suitable where the seal is to be covered with asphalt. Alternatively, double applications of binder and aggregate using PMB or Class 170 binder substantially reduce the risk associated with premature stripping. If the existing surface on which a single application geotextile sprayed seal is placed is coarse (>1.5mm), an initial application of a 7mm sprayed seal may be used to reduce the texture and lessen risk of premature stripping.
Special seal locations • Fords/ areas subject to inundation • Flushed areas • Shoulders on highways and freeways • Dusty desert country	• A heavy robust surfacing is required. Generally this involves a double application seal using combinations of 20mm with 10 or 7mm, or 14mm with 7mm. • If single application seals or corrective treatments are considered unsuitable, then an effective alternative can be a double application seal using 20mm with 10 or 7mm, • Generally the greatest durability is obtained with two application seals using a combination of 14mm or 10mm with 7mm (or 14mm plus 10mm where a heavier treatment is required to resist reflection cracking) • Consider double application seal where the role of the top seal coat is to protect the binder in the bottom coat from deterioration/contamination from dust.	

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

A complete list of "pavement work tips" issues is available on AAPA's web site: www.aapa.asn.au

Issues may be downloaded using Adobe Acrobat Reader. Copies may also be obtained from AAPA.

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