



ISO 9001  
SAI Global



## TECHNICAL BULLETIN # 37

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# POLYSEAL

## A Tough Sprayed Sealing Binder

### Description

PolySeal is a polymer modified binder used in sprayed sealing applications where a tough seal is required. PolySeal is a composite product manufactured by blending bitumen, with a polymer composite. The combination of high toughness, elasticity and excellent adhesion make the PolySeal a superior sealing binder.

### Features

PolySeal exhibits superior aggregate retention. Polyseal is a tough binder, yet elastomeric, providing a very “easy to use” substitute for crumb rubber binders and in some situations SBS binders.

Special features of PolySeal are:

- Greater toughness
- High softening point
- Superior aggregate retention
- Crack retardation
- Good storage stability and handling characteristics
- Compatibility with a broad range of bitumens
- Excellent cost-performance ratio
- Less prone to fuming
- Early sweeping capability
- Sprayed at a lower temperature than crumb rubber and SBS binders
- High storage stability leading to longer haulage distances

### Applications

Used for most sprayed seal applications including HSS and SAM where minor cracking is to be covered.

- For quick aggregate adhesion
- Situations where minimal loose aggregate is paramount
- High stress sites or alignments
- Intersections

### Technical Data

The combination of toughness and elasticity means that PolySeal retains aggregate more effectively, while retarding crack reflection. The higher softening point reduces the risk of bleeding.

### Typical Range of Properties

Property	Value
Penetration @ 25°C, pu	40 - 80
Torsional Recovery @ 25°C, %	16 - 32
Softening Point, °C	49 - 56
Viscosity @ 165°C, Pa.s	0.18 - 0.55
Elastic Recovery @ 60°C, %	20 - 30
Consistency @ 60°C, Pa.s	360 - 800

Comparison of Typical Binder Properties - PolySeal vs other PMBs

Tests have been carried out with various binders meeting the Austroads and the New South Wales RMS specifications. The results are as follows:

Test Method	Test Property	PolySeal (S35E)	S35E	15% Crumb	20% Crumb	S10E	S20E
AG:PT/T122	Torsional Recovery @ 25°C, %	29	17	30	35	25	55
AG:PT/T131	Softening Point, °C	52.0	51.0	55	58	57.0	80.0
AG:PT/T111	Viscosity @ 165°C, Pa.s	0.27	0.23	1.10	1.90	0.28	0.43
AG:PT/T121	Elastic Recovery @ 60°C, %	30	25	20	25	30	99
AG:PT/T121	Consistency @ 60°C, Pa.s	480	-	1440	1920	520	5460
AG:PT/T121	Stiffness @15°C, kPa	155	154	92	168	73	57
AG:PT/T124	Toughness @ 4°C, Nm	3.8	3.6	2.5	3.0	1.9	1.7
RTA T238	Adhesion, % stripping	< 5	< 5	< 5	< 5	< 5	5

Toughness Measurements

- The toughness at 4°C of PolySeal was observed to be the highest against other binders at various displacement levels.
- This low temperature test indicates that the binder resists temperature susceptibility.
- The peak force required to stretch the sample was the highest for the PolySeal binder compared to other binders

The combination of great toughness and excellent adhesion make the PolySeal a superior sealing binder without significantly compromising the intrinsic elastic properties and temperature susceptibility.

**Availability**

PolySeal is manufactured and supplied from our production facilities at Sydney, Brisbane, Perth and Melbourne. Transportation of the product to sites at long distance away from the manufacturing plant is simple and easy as the PolySeal has a very long storage life at high temperatures without degradation.

**Storage and Handling**

- Never heat PolySeal above 200°C. PolySeal may be stored for up to 7 days at 175 – 185°C.
- For periods exceeding 7 days the temperature must be reduced to 120-160°C and can be kept at this temperature for up to 30 days without deterioration of binder properties.
- When re-heating PolySeal heat at a maximum of 10°C per hour.

**Recommended Field Practices**Seal Design

A PMB factor of 1.15 is appropriate for 7mm aggregate seals and 1.20 for 10mm and 1.25 for 14mm aggregate seals are recommended. However this factor may need to be increased where traffic volumes are low.

Aggregate

- Pre-coated aggregate is recommended as well as the use of anti-stripping agent. Wet aggregate must not be used.
- PolySeal must not be sprayed over a primer seal for at least 48 hours after the application of the primer, and it is completely dry. Polyseal should also not be sprayed over a primer binder for at least 14 days after the application of the primer binder.

## Cutting practice and Spraying

- Up to 3% cutter may be added to PolySeal when the pavement temperature is below 25°C at the time of spraying, or where the site experiences frosty winter conditions. This allows the extension of the sealing season for PMB's particularly in southern Australia.
- PolySeal can be sprayed using conventional spray nozzles to a road surface temperature applicable to C170 bitumen seals, generally at least 15°C or as recommended by the relevant State Road Authority Guide.
- PolySeal should be sprayed at temperatures between 170°C and 185°C. If streaking occurs during spraying, add cutter.

## Brooming

- PolySeal exhibits the phenomenon of transition after spraying. Initially PolySeal appears similar to C170 bitumen that allows adequate time to incorporate pre-coated aggregate. A transition then occurs about one hour later where the binder exhibits all the characteristics of a PMB including superior aggregate adhesion after which the surface can be immediately broomed.

Due to its superior adhesion and toughness characteristics PolySeal is less prone to stripping in the event of immediate heavy rain. After the transition stage has occurred and the aggregate embedded, stone loss due to wet weather is unlikely to result. This compares favourably to a highly SBS modified binder which is prone to stone loss due to water ingress long after completion.

Spraying when rain is imminent is not recommended as best practice should apply. However, as a sprayed seal binder with the adhesion and tenacity to perform under unexpected adverse conditions, PolySeal, provides the contractor with significant additional comfort and as the ultimate in "user friendliness".

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