



Safer Sustainable Solutions

EMULSION SPRAY SEALS FOR SAFER APPLICATIONS.



Fumes being released into the atmosphere during spraying of hot cutback bitumen

What is spray sealing?

Spray sealing is a fast and economical way to seal a pavement. Spray sealing is carried out by spraying a thin film of bituminous binder onto a pavement and then covering it with a layer of aggregate. The bituminous binder bonds the cover aggregates to the substrate to provide a waterproofing layer with high skid resistance for the road user.

Traditional spray sealing consists of using a hot binder that is stored and applied at temperatures of the order 180 to 190°C.

Advantages of bitumen emulsion over hot cut back binders?



Emulsions are safer to use

- Do not require to be heated during storage or transport
- Require less heating to spray
- Reduced hazards from explosions, fires and serious burns
- Eliminates the need to handle kerosene and adhesion agents on-site



Are more environmentally friendly

- Generate up to 34% less emissions and greenhouse gasses
- No ground contamination at stack sites because no pre-coating of aggregate required



Are less weather dependant

- Can be applied at lower ambient temperatures
- Reduced risk of 'bleeding' during hot weather from entrapment of cutters



Improved in-service performance

- Less polymer and binder degradation during storage due to less heating.

The problems with traditional spray sealing:

- Generates significant amounts of greenhouse gases due to the energy required to heat the binder
- Requires the use of volatile 'cutters' to promote adhesion to the aggregates, particularly in cool ambient conditions
- Risk of serious burns and/or explosions with the handling of hot binders and kerosene
- Risk of the stone stripping if sprayed without adding cutter at surface temperatures below 21°C for bitumen and 28°C for PMBs
- Risk of workers exposure to chemical burns from handling adhesion agents on-site and inhaling fumes from adhesion agents when added into hot binders

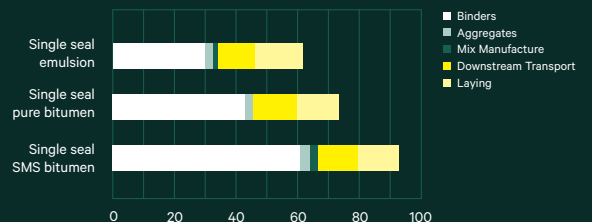


Figure 1: Comparison of Green House Gas emissions

WHY CHANGE TO BITUMEN EMULSION?

Emulsions are inherently safer to use for spray sealing applications than using hot binders that are cutback with kerosene and they also generate less greenhouse gas emissions.

There are also numerous technical advantages associated with the use of bitumen emulsion. These include;

- **Improved wetting of the cover aggregates due to the reduced binder viscosity at ambient temperatures**
- **Improved adhesion due to the physio chemical attraction between the ions in the emulsion binder and the free electrons on the aggregate surfaces**



Natural 'wetting' of aggregate

ADVANCES IN BITUMEN EMULSION TECHNOLOGY.

A number of advances in bitumen emulsion technology have occurred which make emulsions more viable to use compared to standard emulsions, namely:

- **The emulsification of polymer modified binders means higher binder content emulsions with enhanced binder properties can be produced thereby:**
 - reducing the amount of water that needs to be transported
 - providing improved seal performance
- **The spraying of a breaking agent can accelerate the cohesion build-up of the freshly sprayed binder so the road can be opened to traffic sooner. Bitumen additives can also be used for this purpose**
- **The use of thixotropic emulsions means higher application rates can be sprayed without the risk of emulsion "runoff" on steeper gradients**



Emulcol™ breaking agent spray bar

HIGH RESIDUE POLYMER BITUMEN EMULSIONS

SAMiflex E HR range of emulsions are produced from polymer modified bitumen with up to 6% polymer and a solids content between 75% to 78%.

SAMiflex Grade	Base binder
E30 HR	S10E
E40 HR	S15E
E50 HR	S20E
E60 HR	S25E

APPLICATION OF EMULSIONS FOR SPRAY SEALING

Emulsions can be applied when the road surface temperatures are > 10°C and rising. This makes emulsions ideal for using when sealing new pavements in winter or resealing low trafficked roads in cooler weather.

The determination of the application rate must be based on the residual binder content of the emulsion. The same residual binder applications rates must be used as for the equivalent hot binder grade.

Emulsions must not be sprayed on surfaces with gradients >5% to avoid run off. If run off is a risk, then consider using SAMiflex HR emulsions with the Emulcol breaking agent.

For further information

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