

# Polymers Boost Performance of Conventional Fog Seals

By Steven Muncy

**P**olymer modification can enhance the performance of fog seals, experience is showing.

As the awareness of the benefits of fog seals has increased and as pavement preservation is more widely embraced, agencies are looking for increased performance, and information about industry best practices. One way to boost fog seal performance is by polymer modification.

surface layer of asphalt binder lost due to traffic wear, while helping seal minor hairline cracks.

Their application is simple and cost-effective, but must be evenly applied to the full lane. The emulsion cure time can be adjusted to the needs of the project. These applications have been used on surfaces of every type; fog seals may be used on low traffic roads, city streets, parking lots, and even interstate highways.

The asphalt emulsions used in fog

benefits have been well documented. Today, BASF's *Acronal NX 4627* polymer modifier is being used to provide a more robust fog seal for high-stress pavements. The polymer provides a strong bond with better long-term performance, and can also be used to modify most types of emulsions.

## APPLICATION CRITICAL

Fog seals have only one component in the system: application of the emulsion. It is critically important that the application is accurate, and evenly applied. Proper application comes from four factors:

**Surface preparation.** The surface of the pavement must be dry, free from standing water, mud and dust. Power brooms are employed to clean the surface starting at the center line, and continuing to the edge of the pavement. Some areas may need multiple passes. This will provide an uninterrupted clean surface and best adhesion of the emulsion.

**Calibrated distributor.** Modern distributors are fully capable of controlling an even coat of emulsion at the small volume needed for spraying good fog seals. But the machine needs to be calibrated and adjusted periodically to function properly. Items such as nozzle angle, bar height, bar pressure, tachometer speed, and forward speed are each important and controllable. AASHTO, ASTM, many DOTs, and the manufacturer will have a procedure for calibrating the distributor. Be sure to check to find the most applicable method for your area.



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*In Missouri, distributor truck places fog seal application*

## WHAT IS A FOG SEAL?

A fog seal is the spray application of a thin layer of asphalt emulsion to the pavement surface, and constitutes an easy first step toward a full pavement preservation program. Fog seals protect the pavement from oxidation and environmental degradation, as they replace the

seals may be diluted to a lower residue content to allow for better control during application. The penetration of the residue is similar to the asphalt binder used in the same local climate. Some agencies have separate specifications for fog seal emulsions.

Polymer modification of asphalt has been in use for decades and its

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**Proper nozzles.** Distributor nozzles must be capable of applying a small volume of emulsion evenly across the pavement. They must provide a full fan of material to atomize the emulsion for proper curing. Consult your distributor manufacturer for the correct size nozzles.


**Operator training.** The operator must fully understand the capabilities and control methods of the distributor. Starts must be clean with no overlap of the preceding passes. The equipment needs to be inspected daily for proper function.

The best candidates for fog seals are hot mix or warm mix pavements early in their life cycle, when only hairline cracks may exist. Fog seals can fill hairline cracks before they become an issue in themselves. The fog seal places a layer of relatively softer asphalt binder to slow the effects of oxidation and aging common at the surface.

Older asphalt pavements that show no structural problems may also be

candidates. Fog seals replace the binder layer at the surface which is worn off by tires, renew the protective layer, and can provide additional bond to newly exposed aggregate.

Surface treatments, such as chip seals, often include fog seals as a step in installation. The fog seal provides excellent contrast for pavement markings. They are also effective in adding extra bonding adhesion to aggregates. This is particularly important in graded-aggregate seals, in order to hold smaller aggregates that have not been adequately seated by the rollers.

Fog seals provide an excellent means to extend the life of asphalt pavements with minimal cost. Fog seals should be included in every pavement preservation program in agencies of at all levels, and polymer modifiers can boost their performance. 

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