

# Caltrans Fog and Rejuvenating Seals

## Technical Fact Sheet



### What are fog and rejuvenating seals?

Fog and rejuvenating seals are two of many pavement preservation strategies used to defer surface degradation and extend pavement surface life. The primary purpose of using a fog seal is to seal the road surface and defer surface degradation. The primary purpose of using rejuvenating seal is to soften the stiffness of the oxidized AC pavement surface and to extend the life of the pavement surface by adjusting properties of the AC mixture. Some rejuvenators contain asphalt which also seals the surface in addition to adjusting the properties of the AC mixture.

Fog seals are a mixture of asphalt and water applied to the asphalt surface of a road, street or highway. Rejuvenating seals are a combination of various chemicals or a mixture of asphalt emulsion and rejuvenator applied to the asphalt pavement surface. For the rejuvenator seals to be effective, they must penetrate into the existing asphalt concrete surface.

### Chip seal before and after fog seal



Before treatment

After treatment

### When and where should they be used?

#### Fog seal: the following should be considered:

- Pavement surface condition – Dry mixes, high air voids, and surfaces showing minor and/or moderate raveling. Fog seal can also be used on chip seals to prevent aggregate loss.
- Pavement age – relatively newer pavement (typically not more than two years in service).
- Pavement surface mix – can be used on dense-, gap-, and open-graded mixes; however, the seal must penetrate.

#### Rejuvenating seal: the following should be considered:

- Pavement surface condition – old and fairly oxidized surface or surface starting to oxidize or show raveling. In addition to oxidation a pavement surface may begin to show evidence of distress cracking; if this is the case a rejuvenating scrub seal may be used. A rejuvenating scrub seal is the application of a rejuvenating emulsion that is scrubbed into the cracks, followed by the application of aggregate.
- Pavement age – generally used on pavements over two years or more to extend the life of the existing pavement.
- Pavement surface mix – Can be used on dense, gap and open-graded mixes; however, the seal must penetrate.

## What products and specifications are available?

Several products will be available in California and are in use throughout the state. Specifications for the various products have been developed by the PPTG and are available in NSSP 37-600. These specifications can be obtained from either the Caltrans Office of Pavement Preservation or from the California Pavement Preservation Center (Dr. Hicks: [rghicks@csuchico.edu](mailto:rghicks@csuchico.edu)).

Product	Description	Specification and Category
Reclamite	Emulsified recycling agent using heavy oils	NSSP 37- 600 - A
Emulsified restorative seal CRF	Emulsified recycling agent combined with a softer asphalt	NSSP 37- 600 - B
Topein C	Mixture of tall oil pitch, asphaltene resin, and petroleum asphalt emulsified with water	NSSP 37- 600 - C
PASS	Mixture of recycling agent, polymer and emulsified asphalt	NSSP 37- 600 - D
PASS (scrub seal)	Mixture of recycling agent, polymer and emulsified asphalt	NSSP 37- 600 - E
StyraFlex	Mixture of recycling agent, polymer and emulsified asphalt	Alternate Specs D (F)
StyraFlex (scrub seal)	Mixture of recycling agent, polymer and emulsified asphalt	Alternate Specs E (G)

### Safety factors to consider when using fog and rejuvenating seals

Fog and rejuvenating seals are excellent products for restoring the surface condition of an existing pavement. However, they can result in some problems if improperly applied as shown below:

- Seals will have an effect on the skid resistance of the pavement being treated.
- Skid number may expect to drop by 10-20 points for the first 72 hours, depending on the surface being treated and sanding will improve low skid numbers.

### Mitigating measures to insure proper use of fog and rejuvenating seals

- Proper application of the seal can be determined using a ring test available from the product manufacturers.

- Skid number should be checked prior to the opening to traffic for safety.
- When selecting a potential project, skid number of the existing pavement should be checked. If the skid number is already low, the project is not appropriate for fog or rejuvenating seal.

### Key references

For more detailed information on fog and rejuvenating seals, the reader is referred to the following documents:

Asphalt Emulsion Manufacturers Association (AEMA) Web site <http://www.aema.org/>.

Caltrans, "Maintenance Technical Advisory Guide," Sacramento, CA, October 2003. [www.dot.ca.gov/hq/maint/MTA\\_Guide.htm](http://www.dot.ca.gov/hq/maint/MTA_Guide.htm)

Helen King, Study on Fog and Rejuvenation Seals, PP Journal, Winter 2007, pp 10-12.