

CHIP SEAL

A layer of aggregate, or 'chips', embedded in an application of sprayed binder.

A chip seal is a surface treatment that can be applied to a paved surface or primed based course. For this treatment, a rapid setting asphalt emulsion or other bituminous material is sprayed onto the roadway surface, and then immediately covered by a layer of mineral aggregate. Subsequent rolling ensures that the aggregate is properly embedded in the emulsion. Several variations on the chip seal include the double/triple chip seal, Stress Absorbing Membrane (SAM) seal, Stress Absorbing Membrane Inter-layer (SAMI) seal, and the sand seal. Chip seals are not structural in nature and will not correct significant structural failures; however, they are an excellent choice for correcting surface distresses and for slowing the deterioration of mild to moderate and high-density cracking. They also prevent further moisture damage and provide a safety advantage of increasing skid resistance.

PURPOSES:

- Waterproof the surface
- Seal small cracks
- Provide surface texture
- Add skid resistance
- Slow surface aging
- Repair raveling
- Correct surface deficiencies
- Improve surface appearance

Selecting the Project: A chip seal is an excellent preservation tool. It is best used for addressing minor cracking or surface deficiencies, and can significantly extend the life of an asphalt pavement at a relatively low cost. Significant cracking and localized structural failures should be addressed prior to the chip seal application, using crack sealing or full-depth patching.



CAUTION: Depending on the bituminous material choice, chip seals may take several hours to cure, and may not be practical for high traffic areas or intersections where traffic cannot be feasibly restricted during that time. A chip seal may not be aesthetically desirable for roadways where smoothness and/or noise is a primary concern, such as high-density urban areas, bike lanes, or parking lots.

Materials: Chip seals most commonly use a rapid setting emulsion, but may also include PG binders, asphalt rubber, or rejuvenating emulsions.



Chip seals depend greatly on material quality. Aggregates should be **single-sized** (usually 3/8" – 1/2"), **clean** (<1.5% dust), crushed, cubical, and free of clay. Excessive handling creates dust, which significantly decreases the ability of chips to bond with the emulsion. All materials should come from an approved source and/or meet state specifications.

Equipment: A **distributor truck** with a calibrated spray bar should be used to apply the emulsion at the design rate and with no streaking. A **chip spreader** should apply complete aggregate coverage in a single layer. **Pneumatic rollers** help set the aggregates, and **brooms** are used to sweep away excess chips.



Cost:



\$1.25 - \$2.50 / sy
\$8,000 - \$14,000
/ lane-mile

Construction: Place during dry, warm conditions when no rains or high winds are forecasted – (April to Sept.) The surface must be swept clean and should be dry. The chip spreader should closely follow the distributor truck, and multiple rollers should be used if possible. Paper joints can be used to improve construction joint quality. Trucks delivering aggregate should avoid turning movements on the fresh surface, and broom trucks should sweep the surface as soon as practical and then periodically as needed. Traffic speeds should be limited until chip shedding has subsided.

PAVEMENT LIFE EXTENSION GENERATED BY CHIP SEAL

	LOWER TRAFFIC	HIGHER TRAFFIC
Asphalt surface – 3 to 5 yrs old, good/fair condition	10 – 15 yrs	8 – 10 yrs
Asphalt surface – aged, fair condition	6 – 10 yrs	5 – 7 yrs
Chip Seal – fair condition	7 – 10 yrs	5 – 7 yrs



Asphalt Surface Treatment Options

Arkansas Technology Transfer
University of Arkansas
www.cttp.org/t2

