



Chip Seal Material Best Practices

Aggregates: The quality of aggregate is important to the overall success of the chip seal. Consider the following factors when selecting your chip seal aggregate.

Type: Commonly used options include granite, limestone, slag, or other hard, durable crushed stones. Material testing criteria ensure local aggregate sources meet the quality needed. Using low-quality aggregate can result in premature failure of the chip seal.

Skid Resistance: Select an aggregate that provides adequate skid resistance, especially in wet conditions.

Grading: Ensure a well-balanced aggregate gradation with mostly single-sized aggregate. Select angular aggregates with sharp edges to provide better mechanical interlocking and stability. Flat or elongated particles can lead to uneven surface texture and inhibit binder adhesion. The maximum amount of flat and elongated aggregate for chip seal is 12%, measured with a 3:1 ratio using ASTM D4791.

Cleanliness: Aggregate should be washed so that P200 is < 2.02%.

Moisture Content: Maintain a proper moisture level in the aggregate to facilitate optimal adhesion to the binder. The optimal moisture content is typically in the 3-4% range by dry weight; however, this can vary depending on aggregate type and its absorption rate. (Max rate 5% and/or excess water runoff.)

Quality Control: Aggregate should be tested for quality parameters like crushing strength, soundness, abrasion resistance or other special needs to ensure it meets project specifications. (Have supplier provide testing results.)

Aggregate Compatibility – Adhesion: The emulsion must effectively bond with the selected aggregate. Review testing from supplier to ensure compatibility.

Binder: There are two types of chip seals, those with emulsified asphalt or hot asphalt cement with modified or unmodified binders. Regardless of the type, binder should meet the following requirements.

- The binder should not bleed when applied at the appropriate rate.
- During application, the binder should be fluid enough to uniformly cover the surface, yet viscous enough not to puddle or run off the pavement.
- The binder should develop adhesion quickly and hold the aggregate tightly to the surface of the road.

Chip Embedment: Embedment is typically 40-50% following application, rolling and the initial compaction. After several weeks of traffic, the aggregate is further pushed into the binder resulting in the desired final embedment of around 60-70%. Too little embedment can lead to premature aggregate loss. Too much embedment can lead to bleeding.