Evotherm® Enables Fiberless Stone Matrix Asphalt.

Stone Matrix Asphalt (SMA) Mixture Challenges

SMA mixtures are known for outstanding performance when produced and placed correctly. However, a high potential for binder drain-down exists due to the high asphalt content. Liquid binder can run off the aggregate surface which results in "fat spots" and segregated areas of high and low binder content. Polymer-modified asphalt (PMA) and fibers are commonly used to help reduce drain-down. Fibers help hold the asphalt in the mix by increasing surface area but also present additional challenges like the added hassle and cost of fibers, and mixtures that are stiffer and more difficult to compact.

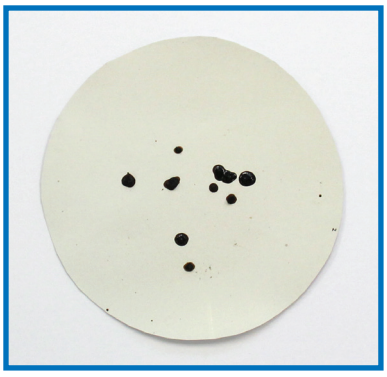
Fiberless SMA With Evotherm

Using a low-temperature WMA additive like Evotherm is a proven way to eliminate drain-down without the use of fibers. Almost 2 million mix tons of fiberless SMA with Evotherm have been paved across the U.S. Three hallmark benefits of these mixtures are improved drain-down, remarkable cost savings, and increased density and workability.

Improved Drain-Down

Most SMA specifications require drain-down results of less than 0.3 percent. The images below demonstrate the difference in drain-down between conventional HMA without fibers and Evotherm WMA without fibers in a PG 76-22 mixture. Using Evotherm means no fibers are needed and drain-down requirements can be met.

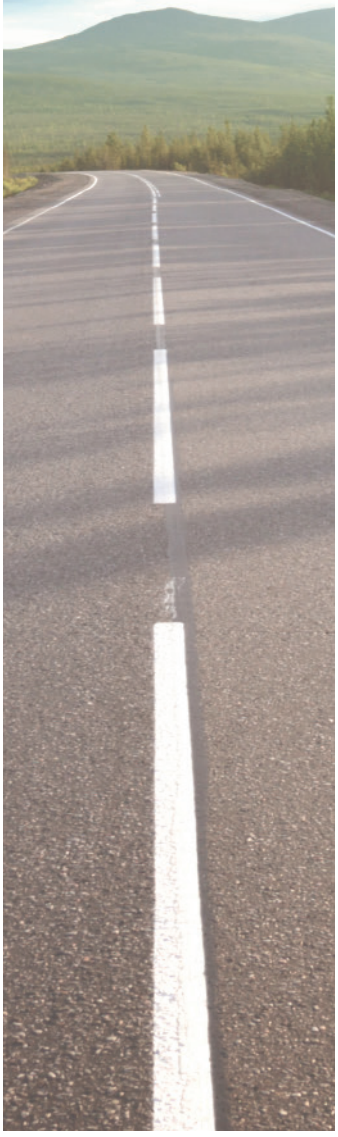
Fail: HMA without fibers at 325 F and 0.69 percent drain-down.



Pass: Fiber-free Evotherm WMA at 275 F and 0.11 percent drain-down.

"It was a challenge to provide cost-effective SMAs before Evotherm. Adding Evotherm allowed us to eliminate fibers and decrease the AC. Plus, we could reduce paving temperatures to 270 F by using WMA."

Jeff Graf,
Vice President,
Maryland Paving



Fiberless SMA Cost Savings

In addition to the measurable bottom-line savings of a fiberless SMA mixture, using Evotherm can reduce energy consumption and increase haul time. And without the use of fibers, plant production and mixing time improve.

Removing Fibers Saves Money	
Component	**per ton**
Cost of fibers • Material • Machine rental • Setup	$2.40 - $2.50
Savings on liquid PG 76-22 • Index price $613.57 (June 2019) • 0.3% liquid reduction	$1.84
Labor and equipment • Varies by company • 1 additional laborer • 1 backhoe (1 operator)	$1.25 - $1.95
Total savings of fiberless mixture	**$5.49 - $6.29**

Savings per mix ton

> $5.00

Increased Density and Workability

By nature, SMA is a very stiff mixture. Adding Evotherm to SMA - like other asphalt mixture types - has a track record of improving compaction and increasing workability.

"Maryland Paving's gauge technician was skeptical that the Evotherm SMA mix would compact at lower temperatures," explains Pete Truncale of the field applications engineering team at Ingevity. "Even as temperatures of the mat decreased, compaction numbers on the gauge rose. Maryland Paving saw densities of at least 96 percent."

Fiberless SMA Mixture Design	
1.	Use existing SMA design with fibers as a starting point.
2.	Determine drain-down (AASHTO T305) and compacted air voids after reducing mix temperature.
3.	Compare drain-down and compacted air voids.
4.	Examine mixing process to ensure coating is taking place (AASHTO T195, Degree of Particle Coating).
5.	Make mix component adjustments if necessary. For every 0.1 percent of cellulose fibers removed, remove the same amount of asphalt binder.

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