

# ACE FIBER

## Asphalt Additive

### Frequently Asked Questions

#### [Why should we consider using ACE Fiber?](#)

ACE Fiber is made of aramid which has been proven to increase the strength, crack resistance, rut resistance, fatigue life, toughness and service life of any asphalt concrete (A.C.) mixture.

#### [How much does ACE Fiber cost?](#)

Ace Fiber is between 10% and 20% of the cost of A.C., depending upon your local asphalt mix tonnage price.

#### [Is ACE Fiber worth paying 10 or 20% more for?](#)

Using the proper amount of aramid fiber can reduce the overall cost of your project and it can increase the life of your A.C. pavement. Paying 10% to 20% more for A.C. mix that performs over 50% better than standard A.C. mix is the simplest financial justification for using aramid fiber. However in certain situations, you can use aramid fiber to reduce the amount of A.C. needed for your pavement sections to save costs.

#### [How does ACE Fiber increase performance?](#)

Testing on ACE Fiber has produced results showing 140% increase in crack resistance and 60% increase in rut resistance. Aramid has also been the subject of numerous U.S. and international asphalt performance studies over the past 15 years. Fiber additives for A.C. have a history dating back more than 40 years, but it has been the recent advancements in materials and the way pavement researchers test and quantify performance that has confirmed the predictability and reliability of aramid for A.C. pavements. The combination of historical and recent research, testing, and case studies demonstrate the active material in ACE Fiber significantly enhances A.C pavement performance.

## What is unique about ACE Fiber?

Because aramid fiber is a very lightweight and difficult material to work with, Surface Tech pre-treats its aramid fibers by soaking them in a wax binder. This pre-treatment weighs down these lightweight fiber clips and prevents them from blowing away or clinging together during the delivery and feeding process. Raw and untreated aramid fiber can physically blow away or get sucked into an asphalt plant bag-house when trying to feed into an asphalt mixer. Untreated aramid has the tendency to stick together and “clump” in feeding and mixing process, which means the fibers do not distribute evenly in the plants mixing chamber.

## What is ACE Fiber pre-treatment process?

Ace fibers unique pre-treatment controls the aramid fiber clips during the delivery and feeding process. Once in the mixing chamber, the binder wax treatment on the fiber clips melts to release the individual aramid fibers while they are being blended with the hot aggregate asphalt. ACE Fiber, mixes thoroughly and completely in the entire asphalt mix without blowing away or clumping like untreated raw aramid.

## What do ACE fibers do in asphalt concrete?

Simply put traditional A.C. is “rocks and glue”. While the aggregate (rock) in A.C. provides compressive strength and wearing resistance, the A.C. while a practical and smooth pavement, has properties vulnerable to temperature changes. When cold, it has a tendency to become brittle and crack, and when warm/hot it has a tendency to soften and flow, which leads to rutting. Since aramid is a fibrous tense solid, its properties remain consistent whether its cold or hot. When the asphalt is cold, aramid fiber will help reduce the cracking effect of A.C. by adding significant tensile strength. When A.C. is warm/hot aramid fibers resist rutting because the fibers are imbedded and rooted in the asphalt to resist flow. ACE Fiber significantly increase the tensile and binding strength of A.C.

## How much Ace Fiber is added to the A.C. mix?

Depending upon the mix design, the weight of the ACE Fibers added to the A.C. is between 4 ounces and 5 pounds per ton of total A.C. mix. This may not sound like much but aramid is a very lightweight material. There are over 19 million aramid fibers in 4 ounces of ACE Fiber.

## How do you use or design asphalt concrete pavements with ACE Fibers?

We have two different approaches to A.C. pavement designs with ACE Fibers.

**Standard practice** – This method is simply using aramids fiber's performance enhancements and applying them to your current A.C. pavement design. If an agency wants to have longer lasting A.C. Pavement, it can simply add ACE Fiber to their mix. ACE Fiber can specifically be used to add extra reinforcement to busy intersections, bus lanes, loading areas and challenging road sections that have a history of cracking/rutting or failing prematurely.

When a street maintenance department uses ACE Fibers, you can reduce your pavement sections from a 3-inch A.C. overlay to a 2-inch A.C overlay without sacrificing performance. This will save you approximately 33% cost savings allowing the redeployment of resources into 33% more overlays in maintenance projects. The reduction in thickness more than offsets the cost of ACE Fiber while enjoying increased performance and life.

**Modified Structural Numbers/Layer Coefficients**- Depending upon which pavement design method used, pavement engineers can design A.C. pavement sections with aramid fiber by modifying their structural numbers or layer coefficients in their design programs. For instance, if a pavement designer is using AASHTO, they can use an enhanced layer coefficient in their design program for the asphalt layout because the fiber mixed asphalt has significantly higher performance characteristics. The pavement designer can then decide how to use the enhanced asphalt performance for thinner asphalt, aggregate, or other layers to save costs, increase life, or a combination of both.

## Is ACE Fiber difficult for asphalt plants to mix?

No. For batch plants the proper amount of ACE Fibers are put into the weigh hopper and mixed as usual. For drum plants, ACE Fibers are manually or mechanically fed onto the RAP belt or blown into the RAP collar at the rate the drum is mixing A.C. ACE Fiber can be fed with different kinds of mechanical feeders that are easy to hook-up without plant modifications. For an additional cost, Surface Tech can also provide third party mixing services performed by licensed and trained engineers to ensure uniform distribution. Pre and post mixing reports are done at the plant or in the field by a licensed engineer to ensure that the proper amount of ACE Fiber was added to the amount of A.C. ACE Fibers are pre-treated so that the fiber filament clips drop into the asphalt mixture and disperse uniformly with the mixing of a batch chamber or spinning of the drum chamber. The individual fibers are also visible upon inspection of fresh asphalt mix.

## Can ACE Fiber be used in warm mix asphalt or porous asphalt pavements?

Yes.

## Can ACE Fiber A.C. qualify for LEED, ISI Rating or Greenroads Points?

Yes. By using ACE Fiber in you project, you are using thinner and/or longer lasting pavement material. This result in less aggregate and asphalt needed and less long term maintenance. These benefits will result in less mining, trucking, energy and manpower for a lower carbon footprint.

## What agencies have used fiber additives in A.C.?

By our estimation, every DOT in the U.S. has used fiber additives in certain asphalt mixes. The most common DOT mix that uses a fiber additive is called stone matrix asphalt (SMA). SMA has been used for almost 15 years in the U.S. and has been described as the best performing asphalt pavement mix design for durable wearing, rut resistance and crack resistance. The fiber used in SMA provides stability and has a filler quality that ensures proper distribution of the highly polymerized asphalt used in the mix.

Aramid fiber not only provides stability characteristics, it also adds significant reinforcement of all types of A.C. mixes. We estimate that reinforcing fibers for A.C. have been used in 35 states. The FHWA has also provided a directive in the most recent President Obama signed transportation bill, MAP21, for DOTs to use fiber based reinforcing additives in A.C. to potentially help our infrastructure last longer than it currently does. MAP21 also has directives for DOTs to use innovative and more effective materials in pavement maintenance methods. The use of fiber additives for A.C will continue to gain more widespread and universal adoption in the coming years.



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