

POLYACRYLONITRILE FIBER (PAN FIBER)

TECHNICAL DATA SHEET



DAWNVIEW

Dawnview™ Polyacrylonitrile Fiber is a type of reinforcing fiber used in asphalt concrete or cement concrete to enhance crack resistance. It is a synthetic fiber processed from polyacrylonitrile resin. Its role in cement concrete is similar to that of polyacrylonitrile fiber, while its role in asphalt concrete is roughly comparable to that of polyester fiber.



PERFORMANCE

The Mechanism of Polyacrylonitrile Fiber in Stone Mastic Asphalt (SMA):

Adsorption Effect of Polyacrylonitrile Fiber:

The small diameter of the fiber provides a large specific surface area, offering tens of thousands of square meters of surface area per gram of fiber. When dispersed in asphalt, the fiber's extensive surface area acts as an infiltrating interface. At the interface, physical and chemical interactions occur between the asphalt and the fiber, resulting in the asphalt aligning as a monomolecular layer on the fiber's surface, forming a firmly bonded structure known as the asphalt interface layer. Simultaneously, the fiber and the surrounding structure of the asphalt coat the aggregate surface, increasing the thickness of the asphalt film on the aggregate. This helps slow down asphalt aging, thus extending the pavement's service life. International experience has shown that SMA pavements can extend the service life by 30-50% compared to traditional asphalt pavements.

Stabilizing Effect of Polyacrylonitrile Fiber:

The asphalt adsorbed by the interlaced fibers increases the proportion of structured asphalt and reduces the amount of free asphalt, resulting in enhanced viscosity and increased softening point of the stone mastic asphalt. This, in turn, improves the stability of the SMA mixture.

Reinforcement Effect of Polyacrylonitrile Fiber:

The randomly distributed fibers within the stone mastic asphalt act as three-dimensional barriers, impeding cracking within the mixture. This improves the self-healing capability of the asphalt pavement and reduces the occurrence of cracks. It should be noted that not all fibers possess this reinforcement effect. For instance, lignocellulosic fibers and mineral fibers have low tensile strength and therefore do not contribute significantly to reinforcement. However, polyacrylonitrile fibers exhibit high strength, making their reinforcement effect more pronounced.

APPLICATIONS

Asphalt concrete or Cement concrete

TECHNICAL DATA

Type:	Polyacrylonitrile Fiber (PANF)
Equivalent diameter	15 ± 2 μm
Length	6 ± 1mm
Specific gravity	1.18-1.20g/cm ³
Elongation at break	12-35%
Tensile strength	≥500MPa
Elastic modulus	>6000MPa
Acid-alkali resistance (retention of strength)	≥95%
Heat resistance	Does not melt under 200°C conditions.

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