FIBERMESH®

FREQUENTLY ASKED QUESTIONS

Micro-Synthetic Fibers

1. Do Fibermesh micro-synthetic fibers reduce cracking? Yes

Fibermesh micro-synthetic fibers inhibit cracks caused by internal stresses. These internal forces that develop in the first 24 hours of curing can result in cracking due to the settlement, shrinkage, restraint and, in some cases, vibration. These cracks do not disappear when the concrete hardens. In fact, most generally, they widen as further drying takes place. These cracks increase the permeability of the concrete, allowing salts and other harmful chemicals to penetrate. The cracking in turn, can reduce the durability and service life of the concrete structure. This type of plastic cracking can be reduced 80-100% with the use of appropriate dosage of Fibermesh micro-synthetic fiber.

2. Do Fibermesh micro-synthetic fibers benefit plastic concrete? Yes

Fibermesh micro-synthetic fibers are manufactured to add tensile strain capacity to freshly placed concrete. The fibers are designed to reduce the most common types of plastic cracking and their destructive effect on long-term durability of the hardened concrete when using the appropriate volumes.

3. Do Fibermesh micro-synthetic fibers affect plastic settlement and cracking? Yes

Fibermesh fibers act as an internal support system retaining a more homogeneous concrete mix. Fibermesh fibers discourage the natural segregation and settlement of concrete ingredients. The internal support system provided by Fibermesh fiber reinforcement results in uniform bleeding because the mix water is not displaced and rapidly forced to the surface by the downward movement of the concrete's heavier ingredients.

4. Do Fibermesh fibers affect plastic shrinkage crack formation? Yes

Plastic shrinkage is a function of the rate and amount of mix water leaving the fresh concrete. Fibermesh micro-synthetic fiber tests consistently demonstrate a reduction in plastic shrinkage crack formation of approximately 80%-100% at appropriate dosages. Overall, plastic shrinkage is relative to the quantity of water introduced to the mix at the time of batching, additional water added at the jobsite and ambient placement conditions. Fibermesh micro-synthetic fibers add tensile strain capacity to early age concrete and can bridge micro-cracks at their lowest energy level to inhibit or stop their propagation. This function occurs in green concrete - usually within the first 3 to 10 hours.

5. Do Fibermesh fibers affect concrete bleeding? Yes

Bleeding is more uniform when Fibermesh fibers are used at an appropriate application rate. Isotropic contributions provided by the support value of the fibers limit the rate and scope of migration of the water from the mass to the surface. Bleed water tends to rise evenly in Fibermesh concrete and surface as a wet sheen on the concrete, rather than rushing up to the concrete surface forming ponds.

(continued)

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6. Do Fibermesh micro-synthetic fibers affect the abrasion resistance of concrete? Yes

Abrasion is resisted when the surface of the concrete has uniform quality paste. Fibermesh fibers contribute to the development of this quality paste by contributions of plastic settlement and plastic shrinkage crack control. A test program designed to evaluate relative abrasion resistance was developed to measure the effect of Fibermesh fibers in concrete when exposed to excessive wear. The Army Corps of Engineers' "Method of Test for Resistance of Concrete or Mortar Surfaces to Abrasion" (Rotating Cutter Method CRD-C52-54) was used.

Test results indicate that the use of Fibermesh fibers will increase the abrasion resistance by 105%, thereby doubling the serviceable life of concrete exposed to similar wear conditions. Tests were also run in cooperation with the Norwegian Highway's Laboratories on Norcem Cement's studded-tire abrasion test machine. At 42 MPH, utilizing steel studded tires and 10-ton axle loads, the equipment accurately demonstrates the effects of 10 years of highway wear at the rate of 15,000 vehicles per day.

The Fibermesh reinforced C-75 specimen exhibited a 52% increase in abrasion resistance by sustaining 34.4% less material loss than the control specimen without fibers. Significantly, the C-50 Fibermesh reinforced specimen, containing less cement, exhibited a 20% increase in abrasion resistance over the C-75 control specimen by sustaining 17.2% less material loss. (The C-50 concrete has a base design strength of 7,252 psi, while the C-75 concrete has a design strength equivalent to 10,878 psi.)

7. Do Fibermesh micro-synthetic fibers affect the impact resistance of concrete? Yes

Fibermesh fiber reinforcement reduces the total crack void structure. This enables the concrete greater shock absorbing quality by transforming it from a brittle to a more ductile material. The relatively low modulus of the Fibermesh fiber contributes to impact resistance. Tests conducted at the University of British Columbia, utilizing an instrumented impact machine indicated the foot-pounds of energy to fracture beams with and without reinforcing bars. The addition of Fibermesh fibers inhibits further crack growth by bridging the cracks that develop. The fibers also enhance the bond between the concrete and the reinforcing bars by inhibiting cracking of the concrete under bearing stresses in the vicinity of the bar deformations.

8. Do Fibermesh fibers affect water migration in concrete? Yes

Permeability of concrete is lowered by the reduction of plastic crack formation and reduced diameter capillary formation. The Von Test method was used to make this comparison at San Jose State University. Water migration rates indicated reduction in concrete permeability of 33%-44% at 1 lb. of Fibermesh fibers per cubic yard, and as high as 79% at 2 lbs. per cubic yard.

9. Do Fibermesh fibers affect the compressive strength of concrete? No

The use of a uniformly distributed, properly engineered Fibermesh fiber at the suggested dosage rate will not affect the compressive strength of concrete.

10. Do Fibermesh fibers affect crazing of concrete? Yes

The reduction of plastic settlement and its contribution of uniform quality paste and bleeding, coupled with proper curing, provide for maximum hydration of the surface and the entire concrete mass.

11. Do Fibermesh fibers affect slump? Maybe

For identical concrete mixtures, addition of fibers can result in a loss of slump as measured by ASTM C 143. This loss is magnified as the aspect ratio (length/diameter) of the fiber or the quantity of fibers added increases. However, this slump loss does not necessarily mean that there is a corresponding loss of workability, especially when vibration is used during placement.

12. Are there typical dosage for Fibermesh micro-synthetic fibers? Yes

Typical dosages are stated on the data sheet.

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