NanoFiber®

Monofilament Polypropylene Micro Fiber for Mortar and Concrete

Product Definition

NanoFiber is a short-cut monofilament polypropylene micro fiber for preventing plastic settlement cracks and plastic shrinkage cracks in concrete. NanoFiber is micro fiber with a dimeter of 18 µm and length of 6 mm and inhibits the formation and coalescence of micro cracks induced by load free reasons like shrinkage and plastic settlement.

Use

NanoFiber is recommended for use in the applications and purposes below.

- For reducing plastic shrinkage and plastic settlement cracks.
- Large-surface area field concretes, slabs and covering concretes.
- Industrial floors.
- Water structures.
- Precast concrete elements and façade panels.
- Slabs and floors of agricultural structures.
- Wet and dry system sprayed concretes.
- For improving fire resistance of concrete and mortar.
- Concrete elements subjected to impact loading like piling concretes.
- Extruded cementitious materials.
- Mortars and plasters for strengthening and repair purposes.

Advantages and Properties

- Reduces the plastic shrinkage and plastic settlement crack formation risk in concrete.
- Improves the cohesion of fresh mixture and reduces bleeding.
- Reduces the number and density of cracks at the initial stages of crack formation.
- Improves durability by reducing the permeability of concrete due to the reduced number of cracks.
- Easily dispersed in cementitious matrix and presents good adhesion with concrete due to the special surface texture.
- NanoFiber fully melts at the temperature levels at around 180 ^{o}C and completely destructed at around 350 ^{o}C. The remaining voids after the fiber destruction acts as interconnected channels where the heated and expanded air could escape without inducing the internal stress causing spalling of concrete during fire. By this mechanism, NanoFiber improves the fire resistance of concrete.
- Alternative to crack control mesh.
- Improves impact and abrasion resistance of concrete.
- Improves the flexural strength of slabs.
- Prevents spalling due to freeze-thaw cycles.
- NanoFiber is a micro fiber that is not seen on the surface of the concrete.
- Corrosion free.

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Application Details, Suggestions and Warnings

- NanoFiber is packed as 0.6 kg water-soluble bags.
- An effective mixing is needed for ensuring uniform fiber distribution in the mixture.
- NanoFiber is compatible with the Portland cement types described in TS EN 197-1. In addition, it can be used in concrete mixes containing mineral admixtures such as silica fume, fly ash and ground granulated blast furnace slag. Trials are recommended before use with different cements and chemical admixtures.
- Normal curing procedures should be followed in NanoFiber incorporated mixtures.
- NanoFiber is not a structural type of fiber bridging load-induced cracks and transfer stress. Structural reinforcement, partially or fully, cannot be replaced by NanoFiber.
- Control joints for restraining temperature and shrinkage cracks should be arranged.
- Workability of NanoFiber incorporated mixtures is usually lower than plain mixtures. Increasing the paste content and adjusting the paste viscosity by using superplasticizers are recommended.
- The excessive fiber dosage negatively affects the workability.

Recommended Dosage

- The recommended dosage rate of NanoFiber is 0.6 kg (one bag) per 1 m^3 concrete. It is recommended that NanoFiber should be added to fresh concrete in ready-mixed concrete plant. In case of addition in ready-mixed concrete plant, NanoFiber should be dispersed in half of the mixing water first and the other constituents, together with the remaining mixing water, should be added to NanoFiber dispersed water and mixed effectively in high speed. NanoFiber can alternatively be added to the fresh mixture during mixing on site. In case of the addition to fresh concrete in construction site, additional mixing time (3-5 minutes in high speed, minimum of 70 drum revolutions) should be applied for ensuring uniform fiber dispersion. Please contact R&D department of Lyksor for technical support.

Technical Properties

Colour	White
Chemical structure	100% polypropylene
Specific gravity	0.91
Water absorption	NIL
Fiber diameter (µm)	0.18 (nominal)
Fiber length (mm)	6
Specific surface area (m^2/kg)	250
Tensile strength (MPa)	300 – 400
Modulus of elasticity (MPa)	~ 4000
Melting point (°C)	160
Ignition point (°C)	365
Thermal and electrical conductivity	Low
Acid resistance	Low
Alkali resistance	%100

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Cleaning of Tools

Concreting tools contact with NanoFiber incorporated fresh concrete can be easily cleaned with water. Hardened concrete can be removed mechanically.

Packaging

In boxes containing 0.6 kg water-soluble bags.

Storage and Shelf Life

Shelf life of NanoFiber is 36 months when stored in its original package and recommended storage conditions. NanoFiber bags should be stored in dry, cool and clean places.

Security and Health

NanoFiber is a non-hazardous and non-toxic material. For further information please refer to Material Safety Data Sheet (MSDS) of the product.

Legal Liability

The technical recommendations in this product data sheet are based on the experimental studies performed on reference concrete mixtures designed in the R&D laboratories of LYKSOR. The results may not be applicable to different concrete mixtures produced with different materials than the ones used in the experiments in Lyksor. All customers and users are required to determine the appropriate LYKSOR products for their intended use and to test the suitability of LYKSOR product for their application. Please contact LYKSOR for the appropriate product selection and usage details. LYKSOR is not responsible for the improper usage of the products.

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