

Naplon fibres for secondary reinforcement

Petrotech Processors, Mumbai are manufacturing and marketing *Naplon* fibres, which are polymeric fibres used for secondary reinforcement of concrete.

Naplon fibres are used in concrete to achieve ductility and to avoid sudden failures. It is clear that the potential applications of fibre reinforced concrete are in the areas where use of conventional concrete has severe limitations and in new areas where other materials give less than adequate performance.

Advantages

Naplon fibres have the following attributes.

- (i) They are stable in environment of concrete over a length of time and are of such nature that facilitates their easy incorporation in the concrete.
- (ii) They function as an integral part of the concrete matrix as far as their behaviour under load is concerned.
- (iii) They are most cost effective.

Naplon fibres are also alkali and corrosion resistant and antimagnetic. The ability of *Naplon* to absorb water (5 percent by weight) allows the fibre to develop a physical and chemical bond with the concrete. They are to be fed into the concrete in the

batch plant and require 4 minutes for thorough dispersion. They are always uniformly mixed throughout, and produce three-dimensional reinforcement. They are added at the rate of 650 g/m³.

Naplon fibres improve the first crack strength and failure strength of concrete for M 25 and M 40 grade. It is noticed that, impact strength of *Naplon* fibre-reinforced concrete (NFRC) increases with increase in volume fraction of fibres. For 0.1 percent of volume fraction, impact resistance of concrete is much more than PC. This is due to the improved ductility. Flexural strength, compressive strength, and tensile strength increase are substantial. Additions of fibres make the concrete impermeable and it also prevents balling of fibres*.

Naplon fibres conform to ASTM code C 1116-89. *Naplon* is much stronger than polypropylene. The plastic shrinkage with *Naplon* is minimum. *Naplon* reduces porosity and permeability of concrete more than polypropylene and helps produce a more durable concrete. The surface with *Naplon* is non hairy and better finished.

The thickness of the roads and pavements can be reduced due to use of *Naplon* fibres. The strength, impermeability and impact resistance are also increased so the fibres tend to decrease the overall thickness of the section achieving the economy in design of pavements and roads. Without welded fabric certain cracks may develop in the concrete after few years but due to inclusion of fibres, such phenomenon is not visible.

Application

Naplon fibres are not intended to replace pri-



Naplon fibres



Concrete mixed with *Naplon* fibres

mary reinforcement, nor are they to be used as a structural element in concrete. They are used for control of plastic shrinkage and thermal cracking.

- (i) They are suitable for slabs of sidewalks, pools, and family dwellings.
- (ii) They can be used for parking structures, warehouses light and heavy industrial warehouse slabs.
- (iii) They are also suitable for highways, roads, bridges, tunnels power plants etc.

For more details, please contact:

Mr Vikram Kapadia
Petrotech Processors
PO Box 11031
New Marine Lines
Mumbai 400020
Fax: (022) 22080404
E-mail: naplon@usa.net



Properties of *Naplon* fibres

Specific gravity and diameter	= 1.16, 0.029 mm
Fibre length	= 15 to 35 mm (mixed)
Tensile strength	= 896.35 MPa
Toughness	= 103.425 MPa
Melting point	= 220°C
Acid and salt resistance	= good
Alkali resistance	= very good
Ultraviolet resistance	= very good
Thermal conductivity	= low
Concrete air entrainment	= no effect

*DHODAPKAR, R.G. Study of properties of *Naplon* fibre (a type of polymeric fibre) reinforced concrete, *M Tech Thesis*, Department of Applied Mechanics, Government College of Engineering, Pune, December 1999.