

SF	<h2 style="margin: 0;">NyconSF Type I Steel Fiber</h2>
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Description

NyconSF Type I steel fibers are discrete fibers for use as reinforcement in cement mortar and concrete. The product is a low-carbon steel fiber available in one standard configuration, which is continuous-deformed. Lengths can range from $\frac{1}{2}$ " to 2" (19 to 63 mm) and the cross-section is crescent-shaped (semi-circle). Dosage levels can range from 20 to 150 pounds per cubic yard (10 to 100kg/m³).

<p>Benefits of NyconSF Steel Fibers in Concrete:</p> <ul style="list-style-type: none"> ▪ Proactive, vs. reactive, three-dimensional reinforcement. ▪ Superior micro-macro crack control. ▪ Even distribution of stress throughout the concrete mass. ▪ Enhanced long-term durability. ▪ Increased flexural strength. ▪ Improved modulus of elasticity (29 million psi). ▪ Enhanced durability properties including impact resistance and fatigue strength. ▪ Increased toughness and residual strength post first crack. 	<p>NyconSF Advantages:</p> <ul style="list-style-type: none"> ▪ Ease of placement compared to wire mesh. ▪ Less time in placing concrete without wire mesh. ▪ No need for concrete pumping in slab-on-ground placements. ▪ Three-dimensionally distributed throughout where wire mesh lies on the subgrade. ▪ Proactive, vs. reactive, plastic-shrinkage crack control. ▪ Will not rust or corrode like wire mesh.
<p>Uses:</p> <ul style="list-style-type: none"> ▪ Plain structural concrete slabs-on-ground ▪ Overlays and encapsulation of existing concrete members/slabs ▪ Elevated decks with composite metal deck system ▪ Precast elements ▪ Shotcrete 	<p>Applications:</p> <ul style="list-style-type: none"> ▪ Commercial, industrial/manufacturing and parking facilities, slabs-on-ground and elevated slabs ▪ Academic, healthcare, correctional and other government facilities ▪ Highway bridge decks, deck and pavement overlays tunnel and shaft liners, airport runways, taxiways and aprons ▪ Marine structures, viaducts, sea walls, hydraulic transfer systems and shoreline attenuation elements ▪ Ballistic and blast resistant elements, seismic resistance reinforcement ▪ Slope stabilization and other shotcrete applications

Dosage Rate:

There are five distinct applications and dosage ranges:

- 1) **Shrinkage Control:** 20-40 pounds per cubic yard (10-25 kg/m³). Length is a factor. At this level, $\frac{1}{2}$ inch (19mm) – 1 inch (25mm) fiber length is typically specified. Fiber count is also a consideration. Impeding or modifying crack growth is one of the benefits of a higher fiber count. There are quantifiable durability benefits provided at this dosage level.

- 2) **Light Traffic and/or Static Loading:** 30-50 pounds per cubic yard (20-30 kg/m³). At this dosage level the fiber configuration is a factor. The length typically specified is $\frac{1}{2}$ inch (19mm) – 1 inch (25mm). Fiber count is also a factor. At this dosage level the steel fibers provide secondary/temperature-shrinkage reinforcement and durability benefits. A degree of load carrying can be assigned to the steel fibers at the

upper end of the range. Composite deck systems for elevated slabs provide an additional application area.

- 3) **Medium Dynamic and/or Static Loading:** 30-65 pounds per cubic yard (20-40kg/m³). At this dosage level the fiber configuration is a factor. The length typically specified is 1 inch (25mm) – 2 inch (50mm). The fibers at this dosage level provide secondary /temperature – shrinkage reinforcement, durability benefits and for slabs-on-ground a degree of load carrying. Utilization in wet method shotcrete and precast products yields benefit.
- 4) **Heavy Dynamic and/or Static Loading:** 65-125 pounds per cubic yard (40-75 kg/m³). At this dosage level, configuration and length are major contributors to mechanical bonding, which translates into enhanced engineering properties. The length typically specified is 1 inch (25mm) – 2 inch (50mm). Applications include runways, taxi-ways, tunnel liners, Slope stabilization and jointless floors.
- 5) **Special Applications:** 100-170 lbs/CY (60-100 kg/m³) is the dosage range. These applications include ballistic panels and thin architectural panels.

Mixing Procedures:

NyconSF Type I steel fibers are typically packaged in bags. The United States standard weight of each bag is 50 pounds and the international standard package is 25 kgs. The preferred method for introducing NyconSF Type I fibers is by ribbon-feeding the fibers into the mixing system. As the fibers are being fed into the mixer, the drum is rotating at mixing speed. Special packaging is available on request. Feed/conveyor systems are available for larger projects.

NyconSF Type I steel fiber reinforced concrete can be placed using conventional methods, either directly discharged from the mixer truck chute or conveyed through a concrete pump. The latter may require mix design review to insure optimum flowability as per standard practice. Prior to project start-up, the steel fiber concrete mix as designed by the engineer should be evaluated to ensure design properties are attained and the mix has the proper workability. When a concrete pump is used, the ready-mix truck chute should be kept approximately 12-18 inches (30-45cm) above the grate on the receiving hopper. This will reduce the potential of the fiber reinforced concrete constricting flow through the grate. When pumping steel fiber-reinforced concrete (SFRC), the grate should never be removed.

Finishability:

Placing and finishing SFRC requires only standard equipment. The sequence of operation remains consistent with conventional concrete placement. Manual movement of the SFRC should always be handled with a come-a-long; a tined rake should not be used. Ideally, to achieve a good workable surface to finish, use a vibrating screed, roller screed or laser screed. Use only metal hand tools in the finishing operation. Do not over-vibrate the concrete as it can cause segregation and/or reorientation of the fibers.

For textured surfaces, use a stiff bristled broom or wire tined comb. Pull the equipment in one direction only. Never pull in the opposite direction or across the established pattern. Do not use wet burlap to texture the concrete surface, as this method can potentially pull out the fibers.

A wet-cut saw can be used to cut joints. Curing should commence as soon as possible.

Compatibility:

NyconSF fibers are compatible with all concrete admixtures and additives. No adjustments to standard dosage levels for admixtures or additives are required.

Guidelines:

NyconSF fibers should not be used to replace structural, load-bearing reinforcement, or as a means to use thinner concrete sections than specified; neither are they intended to increase joint spacing beyond those dimensions suggested by PCA and ACI industry standard guidelines.

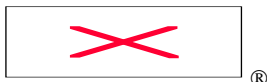
Packaging:

NyconSF Type I steel fibers are typically packaged for the United States in five-ply paper bags with a polyethylene lining with the net weight of 50 pounds. There are fifty 50-pound bags per pallet with a net pallet weight of 2,500 pounds. Each pallet is stretch-wrapped. The pallet is labeled as to contents. A truckload contains 17 pallets with a net weight of 42,500 pounds.

Steel fibers for use in concrete must meet either ASTM A820 Type I or Type II specifications and ASTM C 1116. ASTM A820 provides the physical property requirements the fibers must meet to insure uniform performance. ASTM C1116 is used as a general requirement for fibers in concrete and shotcrete. NyconSF Type I is cold drawn wire steel fiber meeting the ASTM A820 Type I requirements as well as C1116 Section 4.1.1 requirements. In addition, the manufacturing facility is ISO 9001 certified.

Support Services:

Nycon engineers are available for assistance in selecting the appropriate Nycon steel fiber product and dosage level for specific applications and for on-site field support. Nycon's engineering staff will provide analysis of any steel fiber reinforced concrete design and assist engineers/designers in using steel fiber-reinforced concrete as an alternate design.



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