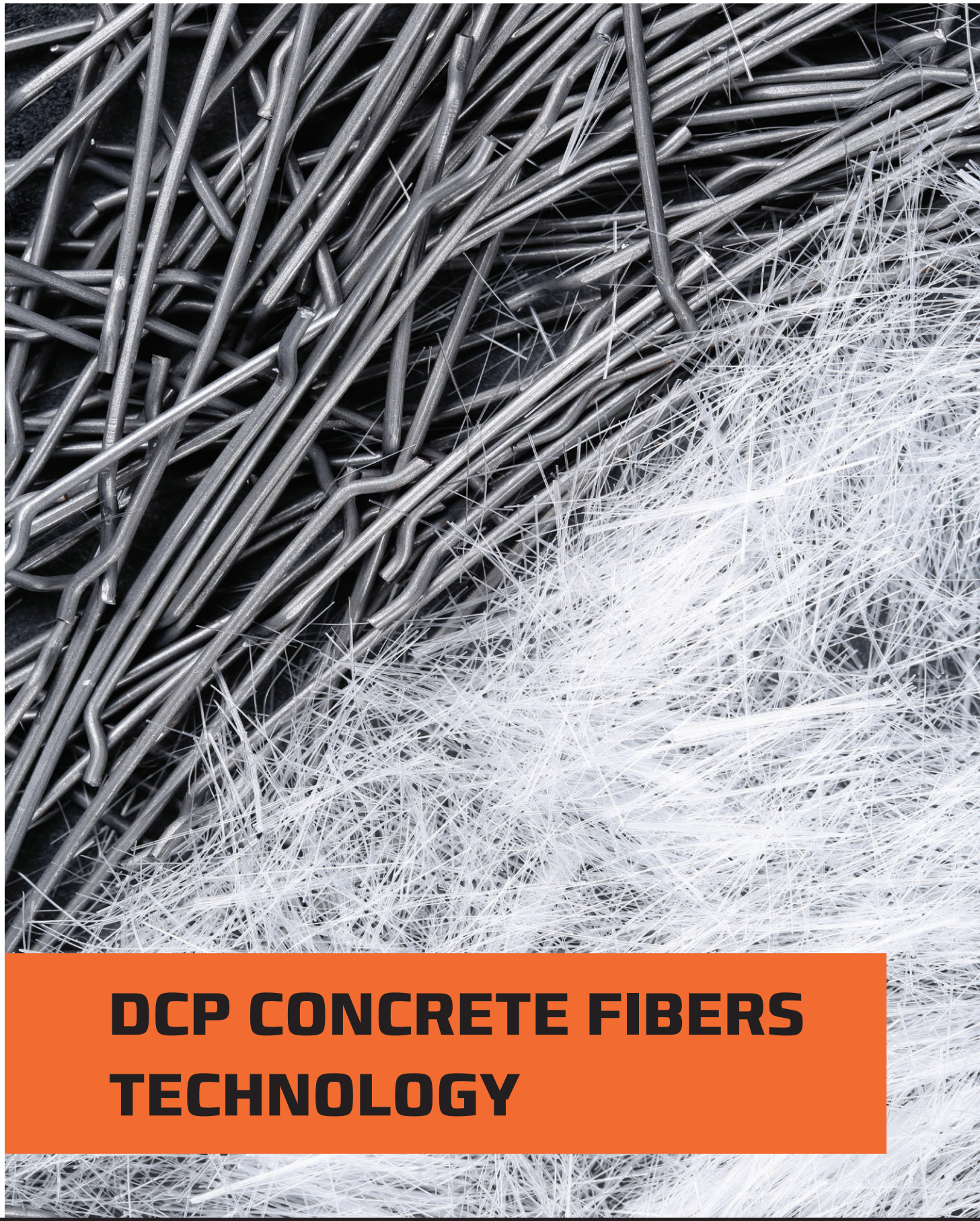


DCP CONCRETE FIBERS TECHNOLOGY

DCP Building Excellence

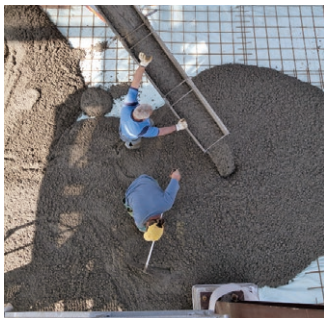
About DCP

Don Construction Products (DCP)

Don Construction Products (DCP) has accumulated over 90 years of experience in developing, manufacturing and marketing innovative construction materials. DCP has operations in North America, Europe, Africa, Middle East and Asia with 14 manufacturing locations and a distribution network to over 30 countries

Full Product Range

The focus of our full product range below caters to our 4 core business units: Concrete & Cement Technology, Underground Construction Technology, Construction Projects Materials Technology and Building Finishing Products.



- Concrete Admixtures
- Surface Treatments
- Grouts & Anchors
- Concrete Repair
- Flooring Systems
- Protective Coatings
- Sealants & Joints
- Waterproofing
- Adhesives
- Tile Adhesives & Grouts
- Building Finishing Products
- Structural Strengthening

DCP's HSE Commitment

- Takes every reasonably practicable step to prevent accidents, injuries and work related ill-health.
- Complies with, and exceeds standards set by all applicable legislation, adopted codes of practice and other requirements. Where none exist; adherence to the stringent standards based on DCP's best practices.
- Actively involves and encourages all employees in the achievement of DCP's objectives.
- Appoints competent people to assist in meeting statutory duties including external HSE performance.

DCP's Environment Commitment

Our commitment to the environment, including a low CO^2 footprint and low dust emissions, enables us to operate production close to residential areas where the most stringent environmental regulations exist. We commit unreservedly to this directive since these residential areas are our own homes and backyards.

Fiber Reinforced Concrete (FRC)

Fiber-reinforced concrete (FRC) is a material made primarily of hydraulic cements, aggregates and fibrous material which increases its structural integrity. Concrete reinforcing fibers are mainly produced from steel or synthetic (polymer) fibers.

Fibers are primarily used in concrete to control cracking caused by plastic shrinkage and drying shrinkage, while some fiber types can also be used as a replacement for traditional shrinkage and temperature reinforcement. Moreover, fibers also reduce the permeability of concrete and thus reduce the bleeding of water resulting in improved long-term serviceability of the structure. DCP offers a full range of fibers under the DonFiber product line to satisfy different project needs.

Concrete Fiber Types

Concrete fibers are available in different materials, sizes and shapes. The major factors affecting the characteristic of fiber-reinforced concrete are water-cement ratio, percentage of fibers, diameter and length of fibers.

All DCP Steel & Synthetic fibers meet or exceed the requirements of ASTM C1116, Standard Specification for Fiber Reinforced Concrete, which outline the following relevant classifications:

- Type I : Steel fiber-reinforced concrete or shotcrete (ASTM A820)
- Type III: Synthetic fiber-reinforced concrete or shotcrete (Polypropylene ASTM D7508)

As well as complying with European Standard EN 14889 (Part 1 for Steel Fibers & Part 2 for Synthetic Fibers).

Areas of Applications for DonFiber Include:

- Tunneling & Mining
- Residential
- Commercial & Industrial Flooring
- Portal Stabilization
- Ventilation Shaft
- Shotcrete
- Segment Lining
- Invert Slab
- Roadways

PP FIBER

Polypropylene (PP) is a thermoplastic material that is made from an artificially created lightweight polymer. They are added to the concrete mix before, during or after batching of concrete and positively affect the physical, mechanical and thermal properties of concrete.

When PP fibers are added to the concrete mix in appropriate ratios, the durability properties of the elements are improved resulting in a reduced total cost. The use of PP fibers also increases the energy absorption capacity of concrete mixtures while also reducing plastic shrinkage cracks.

Polypropylene fibres are the lightest and most easily distributed throughout the cementitious mix in comparison to alternative reinforcement technologies. PP fibres also do not produce dead weight reinforcement when compared to other reinforcement systems as they are used between 90 and 200 grams per square meter (0.02 and 0.04 pounds per square foot).

Why DonFiber Polypropylene Fibers?

- Easy workability
- High strength
- Light weight / Low density
- Easily distributed throughout the cementitious mix
- Improved early age cracking control
- Immense chemical resistance
- Reduced labor cost compared to traditional steel reinforcement

PP fibers have two types - Micro and Macro Polypropylene fibers.
Micro synthetic fibers are the original generation of synthetic fiber and are comprised of polypropylene Monofilament (M), and Fibrillated fibers (F). Whereas, Macro synthetic fibers are the new generation of synthetic fibers such as corrugated polypropylene.

Monofilament type PP fibers are not visible on the screed surface because of their thinness, appropriate results are obtained when they are used especially in indoor screeds. Fibrillated type PP fibers are more suitable for screed and concrete on heavy-duty industrial floors because of their durability and toughness properties.

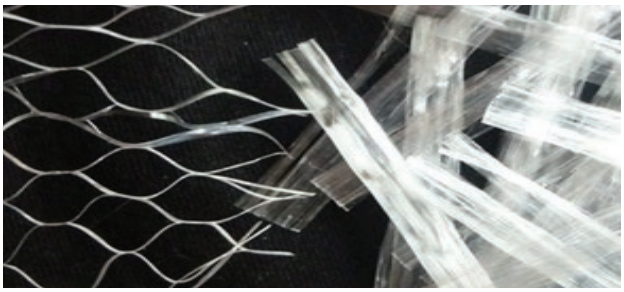
MonoFilament

Bundles that disperse into single fibers

Smooth and have a smaller surface area, they don't anchor into the cement matrix as well as fibrillated fibers

Controls early age plastic shrinkage cracking

Fibrillated



Bundles that disperse into interconnected strands

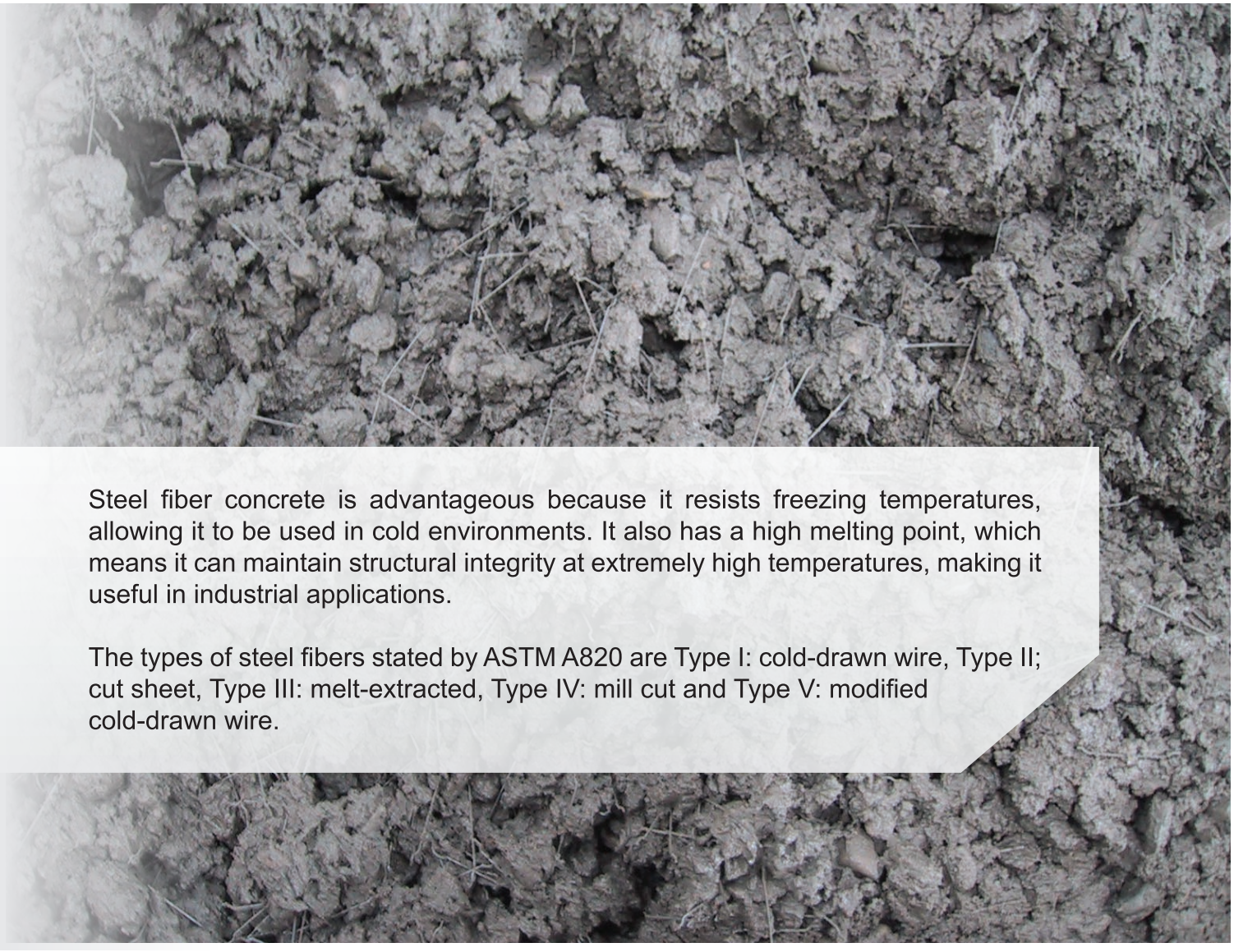
Network of fiber, the cement paste penetrates into the network of fiber filaments resulting in better mechanical anchoring to the concrete.

- Controls early age plastic shrinkage cracking & temperature shrinkage cracking.
- Can be used as a replacement for light gauge welded-wire reinforcement (6x6 W1.4/W1.4)

STEEL FIBER

Adding steel fibers to concrete mixes provides significant structural integrity as they have a high modulus of elasticity. If cracking occurs, steel fiber concrete will limit the impact of the cracks. Implanting these fibers in concrete delivers changes in properties of concrete like resistance to fire, cracking, bending, segregation, bleeding, and many more.

These types of fibres are widely used in beams, columns, bridges, tunneling, refractory linings, explosive resistance structures, boats, etc.



Steel fiber concrete is advantageous because it resists freezing temperatures, allowing it to be used in cold environments. It also has a high melting point, which means it can maintain structural integrity at extremely high temperatures, making it useful in industrial applications.

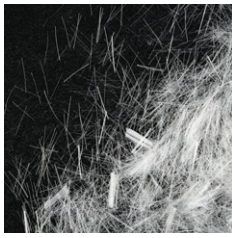
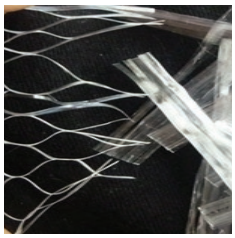
The types of steel fibers stated by ASTM A820 are Type I: cold-drawn wire, Type II; cut sheet, Type III: melt-extracted, Type IV: mill cut and Type V: modified cold-drawn wire.

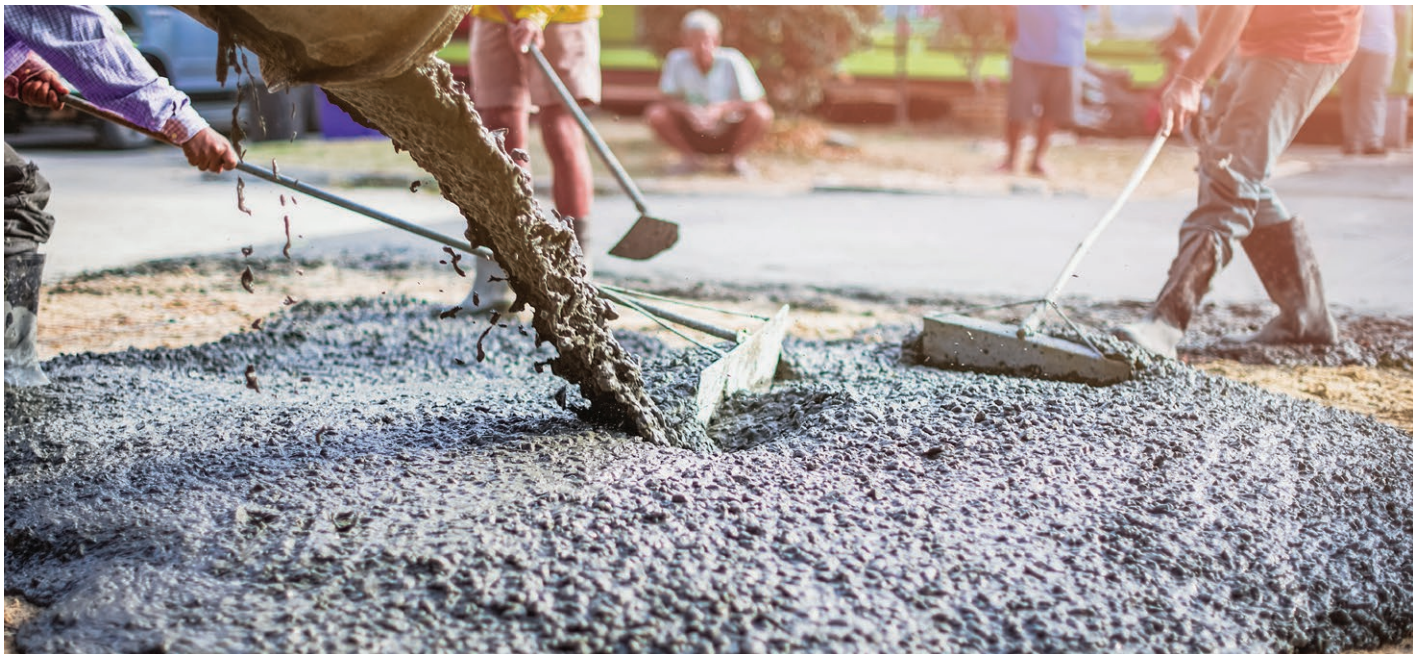
1- Steel Fibers

	Product	Class	Dimensions mm (inch)	Dosage kg/m³ (lb/yd³)
	DonFiber ST Type 1	Hooked	**Length:** 30 - 60 (1.2” - 2.35”) **Diameter:** 0.5 - 1.2 (0.02” - 0.05”)	12 - 60 (20 - 100)
	DonFiber ST300	Crimped	**Length:** 30 - 60 (1.2” - 2.35”) **Diameter:** 0.75 - 1.05 (0.03” - 0.04”)	15 - 40 (25 - 67)

2- Polypropylene Microfibers

Monofilament (Single Length, Graded, Fine Denier, Spalling Resistance)
Fibrillated (Single Length, Graded)

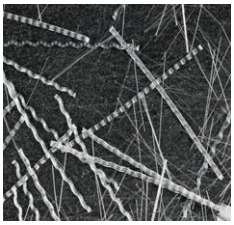
	Product	Class	Length mm (inch)	Dosage kg/m³ (lb/yd³)
	DonFiber PP-M	Monofilament	**Single Length:** 6, 12, 18 (0.2”, 0.5”, 0.7”) **Graded:** 6 - 18 (0.2” - 0.7”)	0.6 - 0.9 (1 - 1.5)
	DonFiber PP-F	Fibrillated	**Single Length:** 6, 12, 18 (0.2”, 0.5”, 0.7”) **Graded:** 6 - 18 (0.2” - 0.7”)	0.6 - 0.9 (1 - 1.5)
	DonFiber PP Ultra	Monofilament (Fine Denier)	**Single Length:** 6, 12, 18 (0.2”, 0.5”, 0.7”) **Graded:** 6 - 18 (0.2” - 0.7”)	0.3 - 0.9 (0.5 - 1.5)
	DonFiber PP1000	Monofilament (Spalling Resistance)	**Single Length:** 6 (0.2”)	1.5 - 3 (2.5 - 5.0)

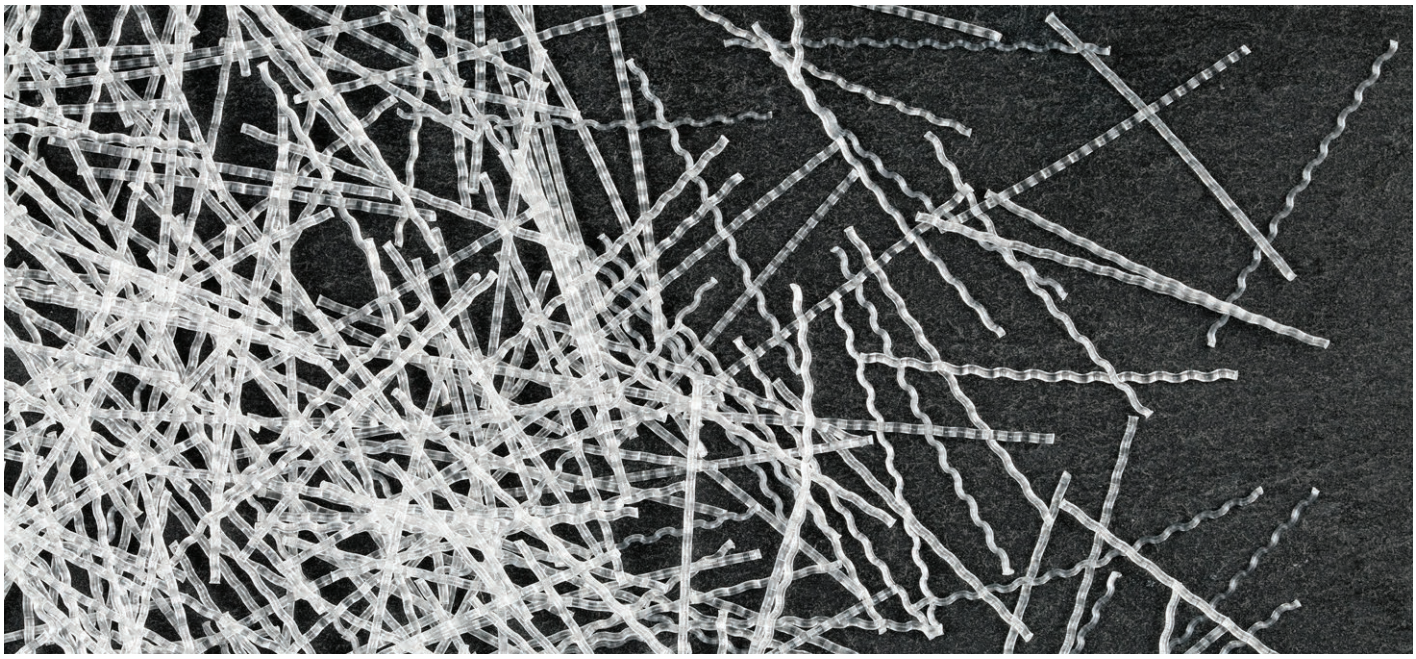


3- Polypropylene Macrofibers

	Product	Class	Length mm (inch)	Dosage kg/m³ (lb/yd³)
	DonFiber PP Macro	Embossed	54 (2.1”)	2.0 - 7.5 (3.3 - 12.5)
	DonFiber PP Macro X	Monofilament (in twisted bundles)	54 (2.1”)	2.0 - 5.0 (3.3 - 8.5)

4- Blended Polypropylene Fiber

	Product	Class	Length mm (inch)	Dosage kg/m³ (lb/yd³)
	DonFiber PP Hybrid	Micro + Macro Blend	12, 18, 54 (0.5”, 0.7”, 2.1”)	3 - 6 kg/m³ (5 - 10 lb/yd³)



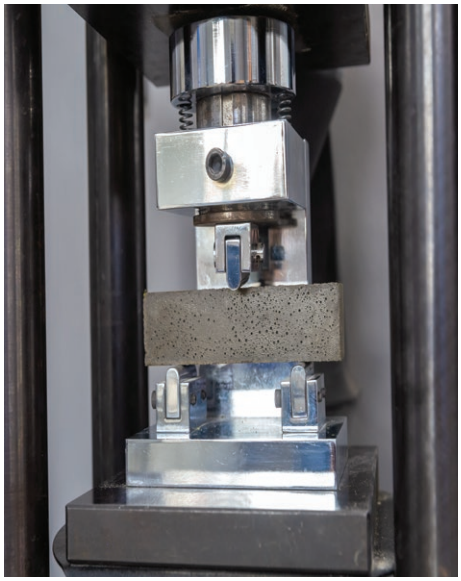
DonFiber Product Range

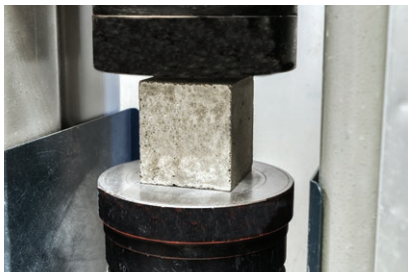
		Microfibers				Macrofibers		Blended PP Fiber	Steel Fibers	
		DonFiber PP-M	DonFiber PP-F	DonFiber PP Ultra	DonFiber PP1000	DonFiber PP Macro	DonFiber PP Macro X	DonFiber PP Hybrid	DonFiber ST Type I	DonFiber ST 300
Fresh Properties	Reduce Rebound of Shotcrete	✓	✓	✓	✓	✓		✓		
	Homogeneity & Cohesiveness Improvement	✓	✓	✓	✓	✓	✓	✓	✓	✓
Early Age Properties	Plastic Shrinkage Cracking Reduction	✓	✓	✓	✓	✓	✓	✓		
	Plastic Settlement Cracking	✓	✓	✓	✓	✓	✓	✓		
Long Term Properties	Restrained Shrinkage Cracking					✓	✓	✓	✓	✓
	Post-crack Reinforcement		✓			✓	✓	✓	✓	✓
	Explosive Spalling Resistance Under Rapid Heating				✓					
	Replaces Light Gauge Welded-wire Reinforcement		✓			✓	✓	✓	✓	✓
	Replaces Traditional Shrinkage & Temperature Reinforcement					✓	✓	✓	✓	✓
	Partial / complete Replacement of Structural Steel Reinforcing Bars								✓	✓
	Shock, Impact & Fatigue Resistance		✓			✓	✓	✓	✓	✓
	Improved Ductility					✓	✓	✓	✓	✓
	Flexural Toughness for Shotcrete					✓		✓		

DCP is dedicated to providing unparalleled customer service and support throughout every stage of the construction process. The DCP team works hand-in-hand with all parties to ensure the completion of the project with the utmost consideration and quality control.

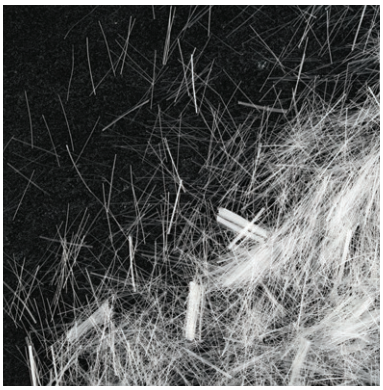
DCP offices all over the world have local sales and technical service teams ready to assist you. Our research and development centres work continuously to ensure we are using the latest technology to deliver the best quality of products and services to consumers. DCP offers:

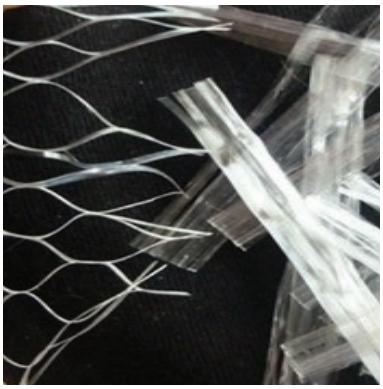
- Properly equipped laboratories in every country to serve clients.
- Testing and evaluation carried out in each country to ensure quality of products.





- Technical design & site support.
- Understanding all business units from the client's point of view.
- Continuous training programs to expand staff and customer knowledge.





Don Construction Products

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