



TECHNICAL INFORMATION

Different Fibers, different characteristics, different results.

All the lines produced by Alpha Ropes® are made with the very best fibers in the market.

Together with our intense search for even better rope solutions, the raw material as always an important and decisive role in this chain.

Our clients want always the best rope and so do we.

Here you have some small presentation of the fibers and some of its commercial brands:

POLYAMIDE - NYLON®

This fiber is well known for its good tenacity and very high elasticity. It is one of the best fibers for uses where shock absorption is important, such as mooring or towing ropes.

Nylon® is one of the Polyamide commercial brands.

POLYESTER - DRACON®/TREVIRA®

The main characteristics of the Polyester fibers are the high tenacity and good abrasion resistance. It is quite flexible, with low water absorption coefficient, and resists well to weather and chemical/physical agents. Polyester is a very "all round" fiber, and can be used in a high range of applications.

ARAMID - KEVLAR®/TWARON®/TECHNORA®/NOMEX®

Aramid fiber had a great success in racing sailing world during the 80's, being the best choice fiber in terms of elongation, creep and breaking load. Usually it was used on the cores.

Nowadays is mainly used on covers, due to the high modulus and high heat resistance. It is sensitive to UV light but it gives an extra protection and smoothness to covers working in high loads and heat situations.

Kevlar®, Twaron®, Technora® and Nomex® are some of aramid commercial brands.

LCP - VECTRAN®

Vectran® is a high-performance multifilament yarn spun from liquid crystal polymer (LCP). This fiber exhibits good abrasion resistance, good high-temperature resistance and high tenacity and modulus. Ensures minimal moisture absorption and outstanding vibration damping characteristics. It is very stable under static loads, showing very low creep, although quite sensitive to weather. Vectran® is produced by Kuraray Co.Ltd.

PBO - ZYLON®

PBO fiber, whose commercial name is Zylon®, manufactured by Toyobo Co., outstands for superior tenacity and modulus against aramid fibers and for a remarkable stability under constant load, which makes it suitable to replace steel rod for rigging. Easily recognizable by its distinctive gold color, this fiber is featured by a great abrasion resistance and excellent heat-resistance, withstanding much higher temperatures than aramid fibres. PBO Zylon® is however very sensitive to UV light and moist. Caution is required for applications involving flex fatigue.

HMPE - DYNEEMA®/SPECTRA®

HPME is a high modulus polyethylene fiber, with exceptional characteristics in terms of tenacity, modulus and abrasion resistance. This fiber is featured by a remarkable light-weight and ensures excellent resistance to chemicals and environmental agents, and a one of a kind durability. The fiber is incredibly versatile with virtually limitless applications. The fiber is manufactured by means of a gel-spinning process that combines extreme strength with incredible softness. So the properties that make this fiber so special are:

High strength/low weight – Dyneema® is 15 times stronger than steel, and 40% stronger than aramids on a weight-for-weight basis.

Low specific gravity (0.97) - Dyneema® floats on water and is ideal for lightweight solutions.

Excellent chemical resistance - Dyneema® is chemically inert, and independent studies have confirmed that Dyneema® performs well in dry, wet, salty and humid conditions, as well as other situations where chemicals are present.

UV resistance – Products made with Dyneema® fiber show strong resistance to photo degradation when exposed to UV light. The high UV resistance of the fiber ensures continuing high performance.

Moisture resistance - Dyneema® fiber is hydrophobic. It resists water absorption, providing an extra level of protection and durability.

High durability - Dyneema® fiber can withstand the harshest environments for a longer time. This is due to its inherent strength, and its resistance to many damaging chemical agents.

Developed and manufactured by Dutch DSM, Dyneema® is often confused with Spectra®, a different commercial brand of the same HMPE fiber.

Alpha Ropes® uses three kinds of Dyneema® fiber: Sk75, Sk78 and the latest Sk90.

Dyneema® Sk75 is the most used one. Dyneema® Sk75 has proven to be highly versatile for a wide range of products, from our Pro Race to the Olympic line range. It is indeed a very light weight fiber, extremely low stretch, with no water absorption and excellent durability.

With similar breaking loads as the Sk75, the Dyneema® Sk78 improves almost on three times the creep performance than the Sk75 offering better rope stability under static loads. It is often use in Ocean Racing.

The latest Dyneema® Sk90 features an even higher modulus (resistance to stretch) and strength when compared to other Dyneema® grades, while preserving existing attributes.

The breaking load is almost 15% higher than both Dyneema® Sk75 and Dyneema® Sk78, with similar creep percentage of the first one. It is mainly used in extreme high performance ropes, where the working load is a very important issue.

	Polyamide	Polyester	HPME	LCP	Aramid	PBO
Tenacity (g/den)	9	7,5	34,2	25	23	34
Elongation on break %	25%	14%	3,4%	3,3%	4%	2,5%
Coefficient of friction	0,12-0,15	0,12-0,15	0,05-0,07	0,12-0,15	0,12-0,15	0,18
Highest workin temperature C	130	170	70	200	400	550
Melting point C	150	260	0,98	330	430	650
Specific gravity kg/dm3	1,14	1,38	1,38	1,40	1,44	1,56
Creep	Fair	Fair	Very Good (Dyneema SK75 and SK90) / Excellent (Dyneema SK75)	Very Good	Very Good	Excellent
Resistance to UV rays	Good	Very Good	Excellent	Fair	Fair	Bad
Weather resistance	Good	Very Good	Excellent	Fair	Fair	Bad
Resistance to abrasion	Very Good	Very Good	Excellent	Good	Good	Bad

Tenacity is the measurement of the resistance of fiber to breaking

Elongation on break is the maximum elongation just at the moment the rope breaks under its maximum load.

Coefficient of friction is based on the rope's resistance to slipping

Highest working temperature is the highest level of temperature the fiber can hold without losing its properties.

Melting point is the point where degradation occurs on the fiber loosing its properties, due to high temperature

Specific Gravity is the fibers density, it means, the relation between mass and volume. Water has density 1, meaning that fibers with values under 1 float, above 1 doesnt float.

Creep is defined as a material's slow deformation that occurs while under load over a long period of time. Is mostly nonreversible. For some sintectic ropes, permanent elongation and creep are mistaken for the same property and used interchangeably when in fact creep is only one of the mechanisms that can cause permanent elongation