

# Dozens of reasons for using Dyneema®

From saving lives to increasing productivity, boosting sports performance or simply increasing the pleasure people take in their leisure activities, there are literally dozens of reasons to use Dyneema®. Discover some of this fiber's many special properties and imagine just what Dyneema® may be able to do for you!



## Lightness

Dyneema® floats, it is the lightest super fiber around. Thanks to its low density, it is ideally suited for floating ropes and innovative, lighter-than-air structures.

Density = 970 kg/m<sup>3</sup>, 5% less than sea water.



## Strength

Dyneema®, the world's strongest fiber™ is 15 times stronger than steel fiber of the same weight.

Tenacity ranging from 2.7 to 4 N/tex.



## Rigidity

Because of its low elasticity, anglers feel the slightest nibble at the end of their lines. They can respond instantly for better action and powerful hook sets.

E = Up to 140 N/tex.



## Flexibility

Dyneema® is the only super-fiber that doesn't break if you bend it or fold it, even millions of times.

Relative Flexlife: Dyneema® 100, Vectran 55, Aramid 8.



## Heat-setting

The physical properties of Dyneema® allow ropes to be 'heat set', a thermal procedure for producing ropes of maximum efficiency and minimum diameter. A competitive edge for the racing sailor. As a result of the heat-setting process, rope strength increases by around 20% while rope diameter is reduced by 10%.



## Low temperature stability

Dyneema® does not freeze, it is tough and does not have a ductile to brittle transition, even at cryogenic temperatures.

Dyneema® survives the liquid nitrogen test.



#### Radar transparency

Thanks to its low dielectric constant and negligible electromagnetic damping, Dyneema® is an excellent building block for radomes, high-frequency printed circuit boards, etc.

Dielectric constant (22°C / 10 GHz): 2.25.

Loss tangent:  $2 \cdot 10^{-4}$ .



#### Chemical resistance

Dyneema® is acid and alkali-resistant. There is no strength loss whatever the pH, making the fiber highly suitable for demanding filtration applications in the chemical and food industries.

No strength loss between 0 and 14 pH.



#### Heat conductive

Like steel, Dyneema® conducts heat very well in the direction of the fiber. High-endurance sports underwear is clearly a potential application.

Thermal conductivity along fiber axis: 20 W/mK.



#### Acoustic impedance

The acoustic impedance of Dyneema® (in the transverse direction) is virtually the same as that of water, making it an excellent sonar window.

Insertion loss of less than 2 dB (0-50 kHz).



#### Low thermal expansion

The thermal expansion of Dyneema® coefficient is both very low and negative, which means that Dyneema® is stable during extreme temperature fluctuations (as in a cooling container, where there is a wide differential between inside and outside temperatures).

Thermal expansion coefficient:  $-12 \cdot 10^{-6}$  per K.



#### Fusible

Dyneema® can be both fused and compacted into solid shapes and yet retains its fiber characteristics. Potential applications include fused yarns (semi-monofilaments) and full PE composites.

Strength retention after fusion: 90% or more.



#### Water stability

Dyneema® does not swell, lose strength or hydrolyze in either ordinary water or sea water. Wet knot strength is equal to dry knot strength.



#### Dyneema® Bio stability

Ultra-High Molecular Weight Polyethylene (UHMWPE), the raw material of which Dyneema® is made, is well-known for its stability and bio-compatibility inside living organisms.

Dyneema Purity® passes cytotoxicity tests.



#### Smoothness

The surface of Dyneema® is as smooth as they come. In other words, it has a very low friction coefficient: 0.04.



#### Abrasion resistance

UHMWPE boasts a very high abrasion resistance. Dyneema® combines this property with its other unique aspects to create the most enduring ropes around.

2.5 to 8 times lower dry abrasion and 1.5 to 40 times lower wet abrasion than all other fibers.



#### Impact resistance

The tremendous amount of energy that Dyneema® can absorb means it is ideal for use in composites that require high impact-resistance.

Twice as much energy required for penetration as in comparable Aramid construction.



#### Bullet resistance

The high sonic velocity within Dyneema® fibers allows local energy to be dissipated very rapidly, thus enabling the material to withstand even ballistic impacts.

Sonic velocity in Dyneema®: 11,000 m/s.



#### Cut resistance

The cut-protective properties of Dyneema® make it suitable for use not only in protective clothing like gloves and shin guards, but also in a wide range of industrial applications.



#### Tear resistance

Fabrics containing Dyneema® are extremely tear-resistant. Minor damage does not propagate easily.



#### Recyclable

As a polyolefin, Dyneema® can easily be melted down after use.



#### UV stability

For a strong polymeric fiber, Dyneema® is exceptionally resistant to UV radiation.

UV-resistance of untreated fiber better than polyester.



#### Washable

Dyneema® experiences no loss of performance after washing. Thanks to the limited dirt adhesion of Dyneema® and high resistance to chemicals, products made with Dyneema® can be washed dozens of times.



#### Skin contact

Dyneema® meets the humano-ecological requirements for direct skin contact. Oeko-Tex Standard 100.