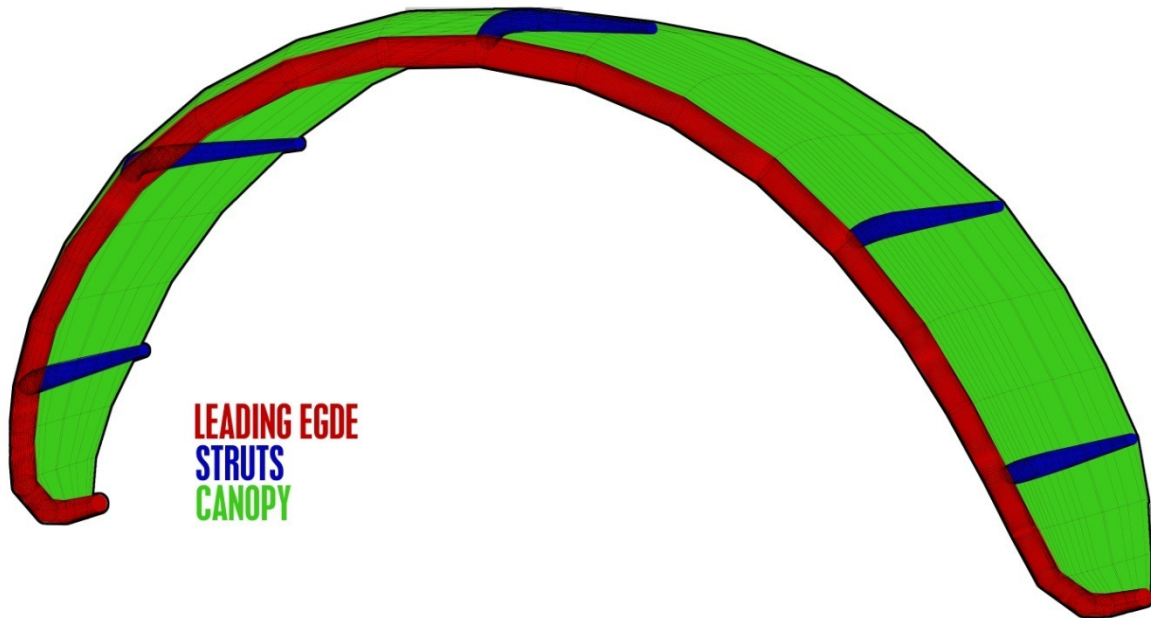


Performance features for improving the turning response of high performance SLE kites without negatively affecting other performance and handling criteria.

The Nemesis HP is a high performance Supported Leading Edge kite. Its design integrates two exclusive technologies that combine to provide exceptionally pure aerodynamic performance and handling characteristics in the same kite.

Typical Supported Leading Edge kite layout.



All inflatable kitesurfing kites follow a broadly similar layout and can typically be considered to be comprised of three distinct structural elements.

- The 'leading edge' is the primary inflatable structure of the kite. The 'LE' provides the backbone upon which the rest of the kite is built, it has to be stiff enough to endow the kite with tip-to-tip stability, while presenting a thin enough frontal area to keep drag to a minimum to allow for maximum aerodynamic efficiency.
- The secondary inflatable structure is comprised of a number of smaller independently placed struts. Each of these is connected to the leading edge at one end. The struts need to be able to twist with the LE under canopy load to allow the kite to deform to facilitate turning.
- The final structural element of an inflatable kite is the canopy. The canopy is a thin, lightweight, fabric attached to the LE and the struts and acts as the control surface and source of propulsive force for the entire kite.

Stiffness Vs drag.

All designers are faced with exactly the same tradeoffs when designing kites – the laws of physics do not change from one designer to another. There are a number of important design characteristics for any inflatable kite that typically force the designer to compromise one aspect of the kite's design or performance.

The design goals of maximum tip to tip stiffness and minimum frontal LE area are in direct opposition to one another. The stiffness of the LE of any kite is directly related to its diameter; the thicker you make the

LE, the stiffer it will be. A thicker LE unfortunately also creates more drag, decreasing aerodynamic performance, reducing its ability to point high upwind and robbing the kite of flight speed.

The Nemesis HP designer has approached this dilemma from a different angle. Rather than being constrained by the available kite design toolset of standard fabrics and construction methods Peter Stiewe has integrated an exclusive, high tenacity, zero stretch Cuben Fibre fabric into the LE of the Nemesis HP.

This 'Cuben Equipped' LE can be made thinner than any Dacron fabric LE, yet can still retain much higher stiffness by safely withstanding increased inflation pressures and having virtually zero stretch. These unique characteristics guarantee improved upwind ability, increased power, higher flying speed, and maximum stability over Dacron based designs.

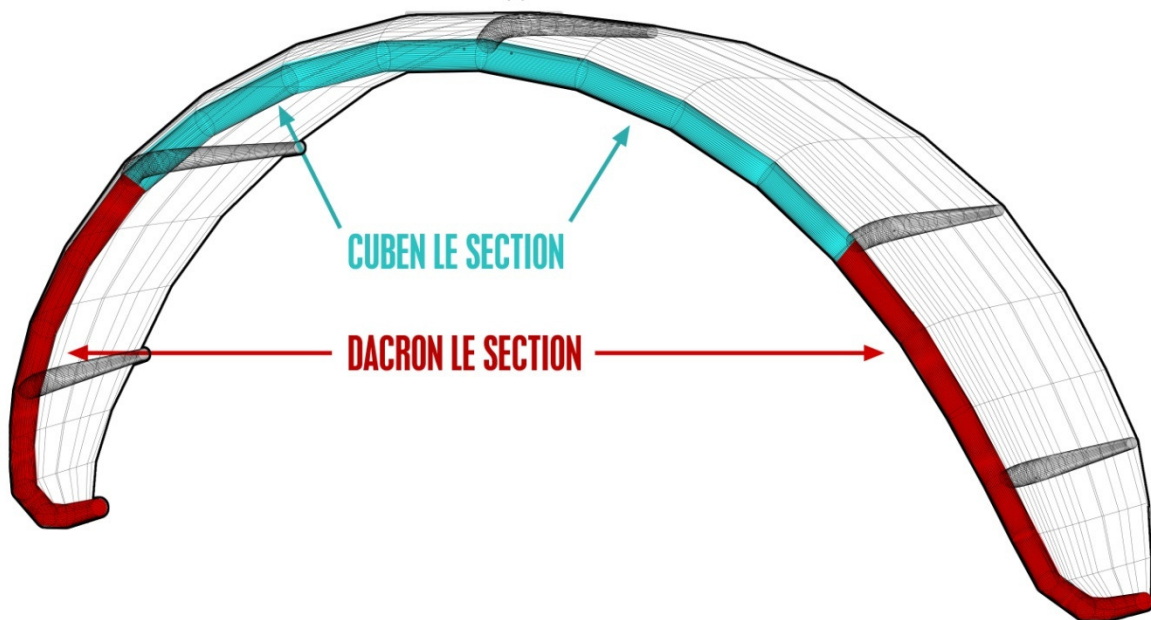
Factors affecting turning performance.

All inflatable kites generate turning force in the same way: steering input from the bar induces bias load deformations in the wingtip canopy area. These localized deformations cause changes in the angle of attack of the wingtip sections, steering the kite like a rudder on a ship. The rider pulls on one side of the bar, the wingtips react by twisting in the required direction and the kite turns.

Partly because of its lack of stiffness, Dacron is an ideal fabric for use in parts of the LE that are required to deform in response to steering input from the bar. However, it is not ideal for the center section of the LE as its lack of stiffness reduces tip to tip stability; requiring that the designer increases the thickness of the LE trading stiffness for aerodynamic efficiency.

The Nemesis HP uses a Hybrid Dacron/Cuben LE, combining Dacron in the wingtip sections where flexibility is required and Cuben fabric in the center of the LE; this combination provides easy rapid turning ability and exceptional aerodynamic performance and stability.

Hybrid Cuben/Dacron LE.

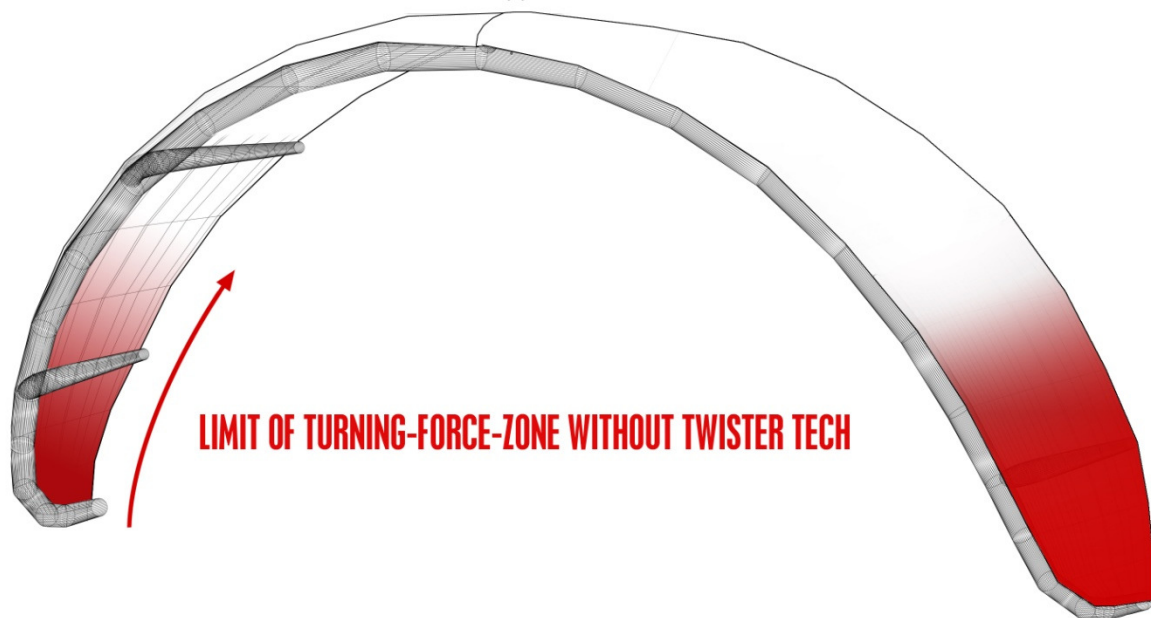


Improving steering response.

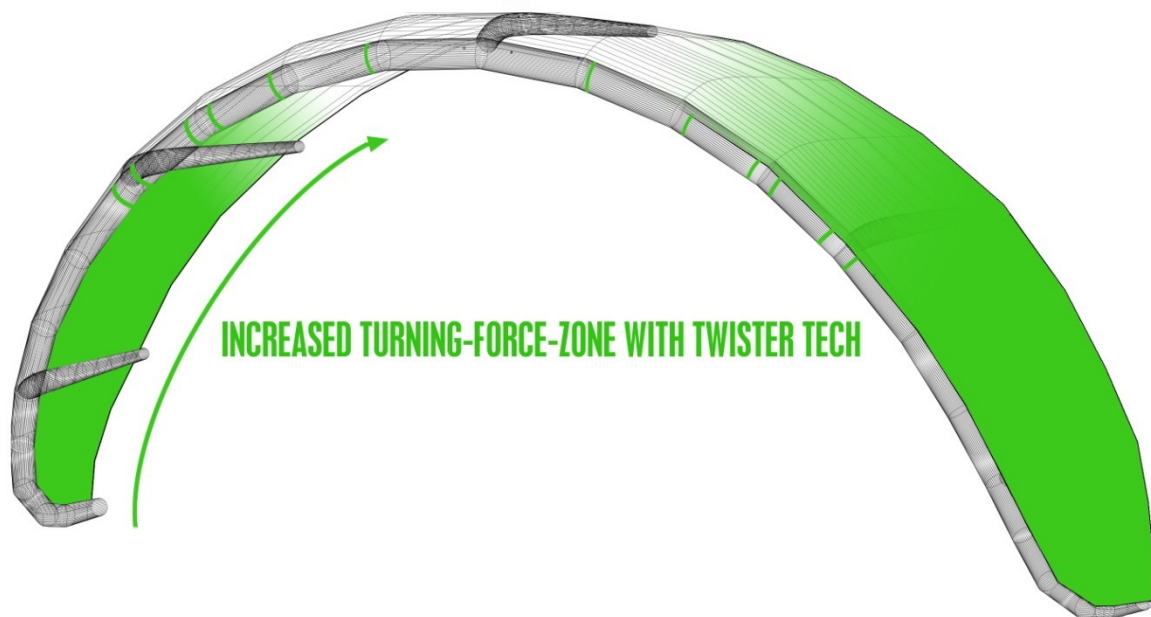
An unfortunate by-product of the requirement that the LE of every kite should provide stiffness and support to the rest of a kite is that the LE also absorbs a significant amount of the rider's steering input. Steering input applied to the canopy via the wingtips is absorbed by the LE fabric as twisting loads. The tip to tip stiffness that a rider needs to support the shape of the kite actually swallows up a significant amount of the rider's steering input.

Improving steering response cont.

Investigative computer modelling of the twisting/bias load distribution across the Nemesis HP showed that the turning performance of the kite could be improved further – even with a Hybrid LE construction – if the design was adjusted to maximize the ability of the kite to respond to steering input.



By reducing the leading edge's unnecessary absorption of bias loads and also increasing its ability to twist, steering input can be more effectively transmitted across an increased canopy area, resulting in faster and tighter turning.

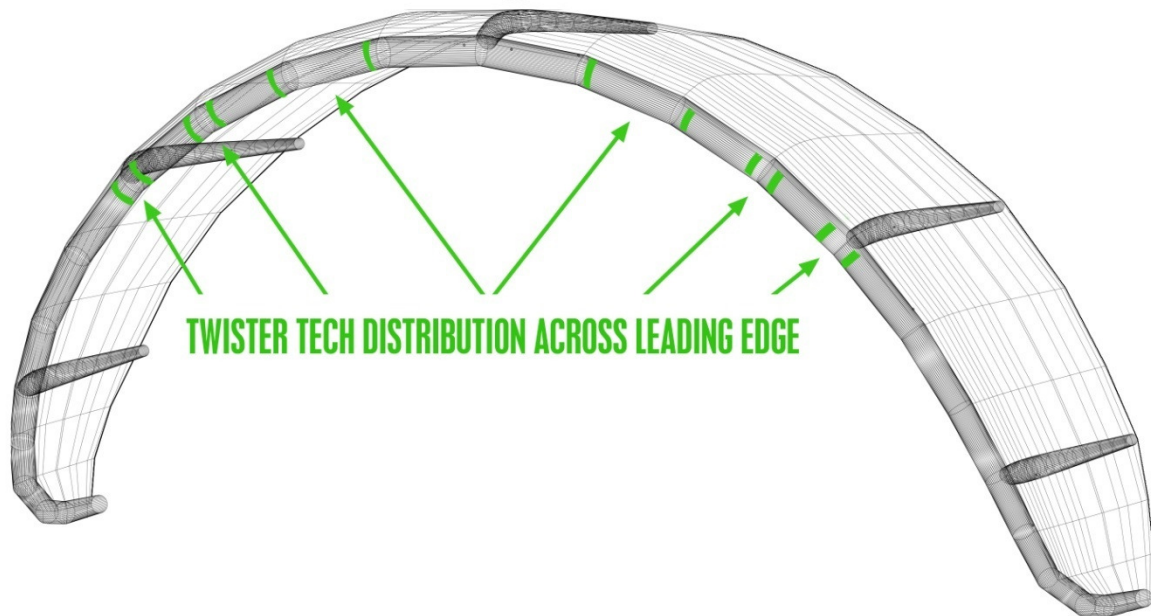


An ideal LE construction would be one that is able to provide the stiffness and support required for stability and aerodynamic performance, but at the same time also allow for the LE sections to twist independently. This would more effectively utilize steering input by spreading it across a larger area of the kite canopy. This increase in efficiency should yield a faster and tighter turning kite.

These very specific technical requirements formed the foundation for the development of an entirely new LE technology: Twister Tech™.

By integrating Twister Tech™ with our tried and tested Cuben Equipped construction, the new 09 Nemesis HP delivers tighter and faster turning ability, with reduced bar pressure, while retaining all the aerodynamic performance and stability of the underlying hybrid LE construction.

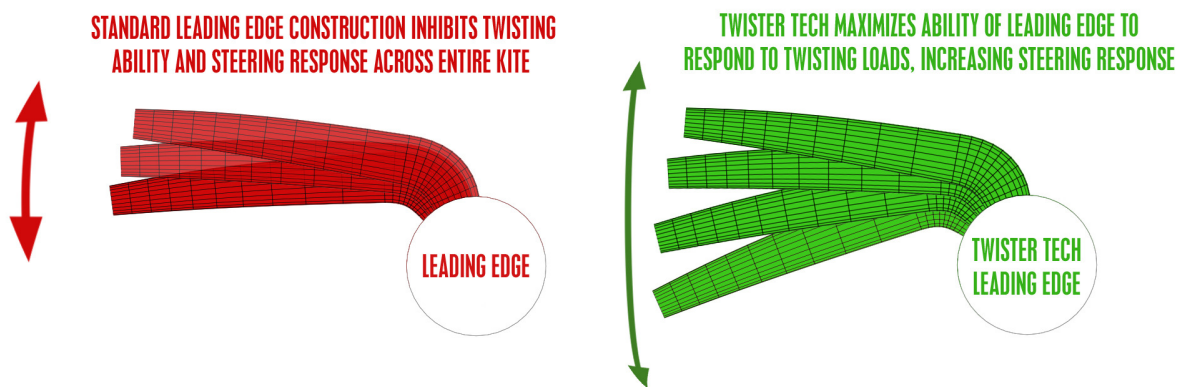
Integration of Twister Tech into the LE of the Nemesis HP.



Twister Tech™ is comprised of continuous segments of a Kevlar reinforced fabric. The orientation of the Kevlar fibers within the fabric are arranged so that the sections are able to deform with a twisting motion when exposed to twisting/bias load, yet remain stiff when exposed to extension loads. The Twister Tech™ rings are interspersed along the length of the LE at locations which allow the entire LE to twist in response to steering load input via the wingtips.

The addition of Twister Tech™ to the LE of the 09 Nemesis HP allows almost the entire canopy to generate effective turning force in response to rider input. By allowing each LE section to twist independently, Twister Tech™ increases turning speed, reduces turning circle and reduces the bar pressure required to make any turn.

Improved steering response from increased LE twisting ability.



By integrating Twister Tech™ into the Hybrid Cuben Equipped LE in the 09 Nemesis HP, the designer has created a kite that is exceptionally efficient aerodynamically, provides a large depower range, has maximum upwind ability, and remains reliably rock solid stable. The 09 Nemesis HP delivers a level of handling responsiveness and manoeuvrability that has not previously been associated with high performance SLE kite designs.

Twister Tech™: a new twist on performance.

Twister Tech™ FAQ:

What is Twister Tech?

Twister Tech is a new leading edge construction technology that allows increased twisting of the leading edge in response to steering input. This increased twisting ability delivers a faster, tighter turning kite.

How does Twister tech work?

Whenever you pull on your bar to turn your kite, most of your steering input is absorbed by the structure of the LE. The wingtips flare as they steer the kite, but the canopy flare never extends much beyond the wingtips. This is because the LE cloth absorbs most of the steering input. With Twister Tech, ring shaped segments of Kevlar reinforced fabric are built into the leading edge, allowing each canopy segment to twist independently in response to rider steering input.

Twister Tech allows your steering input to flare more of the canopy, not just the wingtip panels. With more of your canopy able to react to your steering input, you get faster and tighter turning.

How is twister Tech integrated into the LE?

Twister tech is built into the leading edge using an internally reinforced construction. Internal tape seams are double stitched to form a sandwich construction that is both strong and light.

Does Twister Tech affect the durability of the leading edge?

The Twister Tech inserts are built with Kevlar, the same material used in bullet-proof vests. Because Twister Tech can move in response to twisting loads, it actually reduces the stress experienced by the leading edge of the kite making it more durable than ever.

Was Twister Tech invented at Best?

Twister Tech is a Patent Pending design created entirely in-house by our kite designer Peter Stiewe. It is the product of 18 months of continuous R&D into maximizing the true potential of the SLE kite design.

Does Twister Tech affect the stability of the kite?

Twister Tech only affects the way in which the leading edge reacts to twisting loads generated due to rider steering input. The fiber orientation in the fabric is highly resistant to loads in any other direction, so it has no negative effect on tip to tip stability.

Does Twister Tech give a lighter bar feel during turning?

Yes. Because the leading edge of the kite is no longer wastefully absorbing steering input, the kite has a lighter bar feel when turning and reacts more quickly to your input.

Does Twister Tech affect back line pressure when not turning?

Back line pressure is a product of the canopy profile and the kite's center of effort. Twister Tech does not affect bar pressure unless the kite is turning.

Does Twister Tech improve the wind range of my kite?

Having a faster turning kite allows you to make better use of lighter wind conditions. The addition of Twister Tech to the 09 Nemesis HP helps make light wind kiting more fun.

Does Twister Tech affect the upwind ability of my kite?

Twister Tech has no direct effect on the upwind ability of your kite. Our stiff and incredibly thin Cuben Equipped leading edge design allows for much better upwind riding performance than the fatter Dacron leading edges found on any other inflatable kite.

Does Twister Tech affect the kite's hangtime performance?

Twister Tech works to improve the handling performance of your kite. The exceptional hang-time capabilities of the 09 Nemesis HP are a product of its aerodynamic characteristics, high aspect ratio, ultra thin leading edge and high lift/drag ratio. These remain intact with Twister Tech.

Does Twister Tech improve the jumping performance of the 09 Nemesis HP?

By allowing your kite to turn faster and tighter, Twister Tech will help you improve the timing of all your jumps and tricks.

Can I use a smaller bar on the new 09 Nemesis HP?

Definitely! In 2009, the cross-over kite size for using the smaller 45cm bar is the 12m Nemesis HP. Anything below 12m we strongly recommend only using the 45cm bar.