

# X-DRIVE®



Photo Courtesy Arcona Yachts

UK Sailmakers X-Drive® construction method combines durability, performance, and attractive pricing making it ideal for racing and cruising sailors.

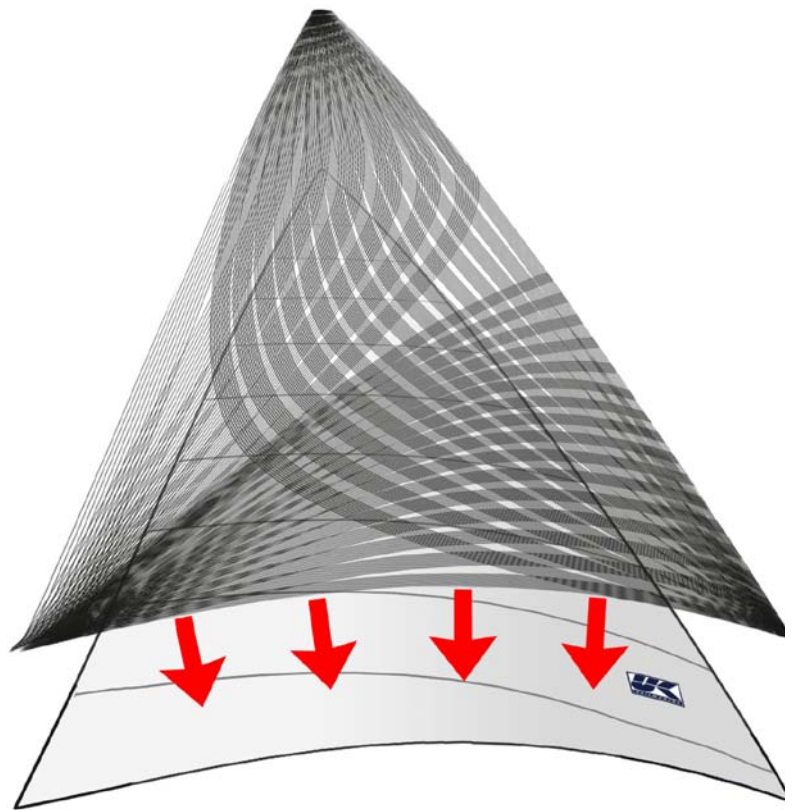


[UKSAILMAKERS.COM](http://UKSAILMAKERS.COM)  
[INFO@UKSAILMAKERS.COM](mailto:INFO@UKSAILMAKERS.COM)

## WHAT IS X-DRIVE?

X-Drive is a two-part construction system as shown in the diagram to the right. The sail's surface is made from a light weight laminate sail cloth cut into cross cut panels that, when put together with broad seaming, reproduces the 3-D shape created by the sail designer. Next, the sail is reinforced with a grid of narrow, high-strength, low-stretch tapes that are bonded to the sail 11 at a time in an 8-inch wide path. The finished sail is similar to a Tape-Drive® in construction, while having the appearance of a membrane sail.

UK Sailmakers' X-Drive construction system uses continuous, high-strength, low-stretch yarns to support the sail's flying shape. Hundreds of closely-spaced tapes are bonded to the sail's surface for maximum strength and shape-holding. With so many tapes running across the sail, the sail has incredible strength and keeps an exceptionally smooth flying shape. UK Sailmakers' innovative tape laying machine individually tensions each tape as they are laid. The machine also speeds the tape laying process, which keeps the manufacturing cost down.



## COST EFFECTIVE

The cost is also controlled because sail surface can be made out of a light-weight laminated material; the lighter the material, the less expensive it is.

The base materials are a balanced laminate that have been specifically developed by Dimension-Polyant for UK Sailmakers Tape-Drive and X-Drive construction process. The skins are available with polyester, Technora, aramid or Spectra scrim and are available with or without a taffeta layer.

*X-Drive sails have dramatically more fibers per square-inch than Tape-Drive sails. The net result is a tremendous increase in total fiber coverage over the whole sail ... better locking in the designed sail shape over that of Tape-Drive construction.*

*X-Drive Cruising Mainsail*



*Tape-Drive Cruising Mainsail*



## CARBON OR GLASS FIBER

CARBON FIBER is the highest performance yarn used in sailmaking. As seen in the chart to the right, carbon yarns are at the top of the chart in three out of four criteria used to measure performance. Carbon fiber's resistance to stretch is three times greater than S-Glass yarns, which are three times more stretch resistant than polyester yarns. UK Sailmakers refers to sails made with S-Glass tapes and polyester laminates are X-Drive Silver sails.

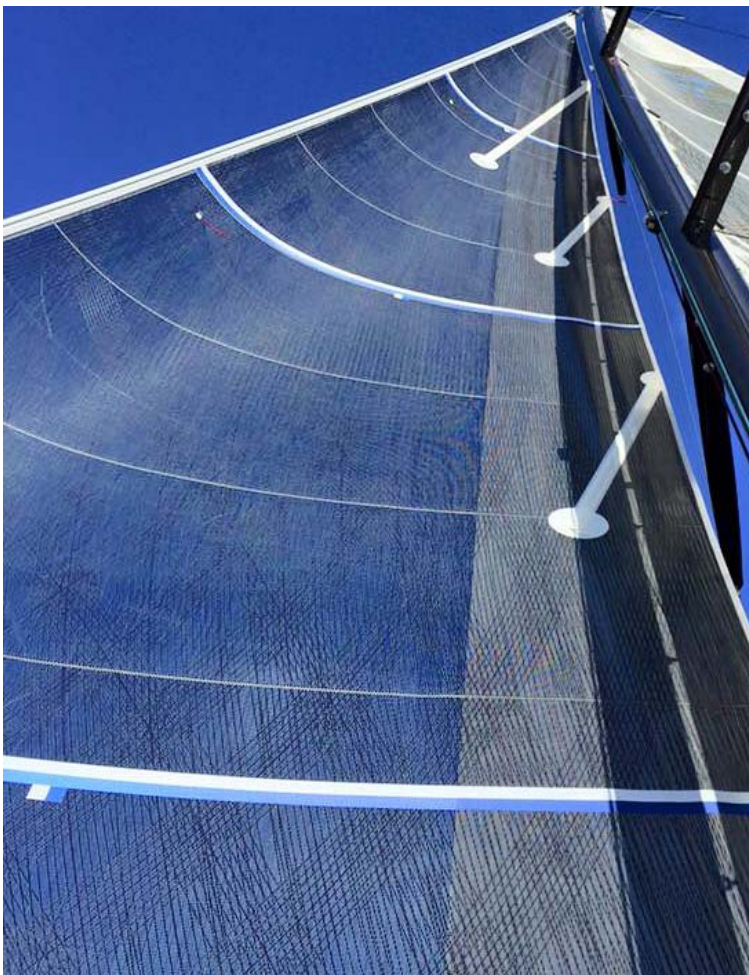
Each tape has 4,000 carbon filaments, which means in an 11-tape pass there are 44,000 filaments of carbon laid at time. That is why the sails are so strong and hold their shape so well.

All the carbon yarns used in X-Drive tapes are dry (not coated in glue) which keeps them from becoming brittle. Keeping the carbon yarns dry improves their flex performance.

## X-DRIVE SILVER

X-Drive sails made with S-Glass yarns are a good solution for owners who want sails that look white, like traditional cruising sails, yet have the performance close to sails made with carbon fiber. As the sail fiber chart above shows, S-Glass yarns have nearly three-times the modulus (ability to resist stretch) and tenacity (breaking strength) than those used in woven polyester (Dacron) sails.

Fiber	Initial Modulus (dg/denier)	Tenacity (gr/denier)	UV Resistance	Flex	Notes
Carbon	1350	60	No Effect	22%	
Spectra	1250	33.5	6/7 months	No Effect	
Aramids	810	28.3	2/3 months	25%	Generic term for Kevlar and Twaron
Technora	540	23.5	3/4 months	7%	
S-2 Glass	401	22	4/5 months	10%	
Polyester	135	7.9	6 months	No Effect	Dacron is made from woven polyester
	Modulus is a fiber's ability to resist stretch. Higher values indicate less stretch, which translates into better sail shape retention	Tenacity is a fiber's initial breaking strength	Amount of time taken to lose 50% of initial tenacity	A measure of strength loss after 60 bend cycles	



**Above:** Close up of X-Drive Silver sail made of S-Glass tapes on a light polyester reinforced laminate. **Top Right:** Over 100 individually laid and tensioned tapes coming out of a genoa's tack. **Right:** An Arcona 465 with X-Drive Carbon roller/furling genoa with a black aramid sail skin.

## TAFFETA LAYERS FOR INCREASED DURABILITY

There is the option to use laminates with a fine polyester taffeta on one side. Laminates made with a taffeta side and film side are made with five bars of pressure (atmospheres). After the X-Drive tapes have been bonded to the film side of the sail, you have the extra option of adding a second taffeta applied over the tapes. While taffeta doesn't add strength to the sail, it does enhance the life of the sail by protecting the tapes and the film layer of the laminate from abrasion.

The extra taffeta can be placed over the tapes partially or with full coverage, completely protecting both the film and tapes. With an overlapping genoa, taffeta can be applied only to the part of the sail that overlaps the mast so that the tapes and film are protected as they are dragged across the mast and rigging during tacking. On a mainsail a one-meter wide strip of taffeta can be applied to the leech, which is most susceptible to damage when luffing or reefing. A partial layer of taffeta is used to save weight.



**Left:** A roller/furling genoa on a Davidson 50 made with carbon X-Drive tapes on a Spectra reinforced laminate. A second layer of taffeta covers all the tapes. **Top:** An Arcona 400 with an X-Drive Carbon main with a one-meter taffeta strip up the leech. **Above:** A Sweden 36 with X-Drive Carbon sails on a polyester laminate that has taffeta on one side. A partial layer of taffeta covers the tapes on the genoa where it overlaps the mast and baby stay. The mainsail also has a strip of taffeta up the leech.



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