

**From the Editors of**

# ***Practical*** ***Sailor***

## **Sail Buying, Sail Making, & Mainsails**



*A Look at Sails Volume One*

# Table of Contents

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- ▲ **Chapter 1:** Navigating a Sea of Sails Page 3  
*Across the Pacific*
- ▲ **Chapter 2:** Sailmakers Page 5  
*Lofts at a Glance • Sailmaker Advice & Estimates • More Sail Lofts*
- ▲ **Chapter 3:** Survey Says Page 16  
*Discount Sail Options • Reader Survey Results & Recommended Sailmakers*
- ▲ **Chapter 4:** A Look at Mainsails Page 23  
*Sensible Sail Choices • Buyers Guide: Choosing a New Mainsail • Fit & Finish*
- ▲ **Chapter 5:** Handling the Mainsail Page 29  
*Track Hardware • Mainsail Handling Systems • Reefing Advice from Pros*
- ▲ **Chapter 6:** Furling Mainsail Options Page 37  
*In-mast Furling Systems • In-boom Furling Systems*
- ▲ **Contacts Directory** Page 42



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# Chapter 1

## Navigating a Sea of Sails

Purchasing new sails can be a big deal for boat owners. Aside from the fact their cost can put quite a dent in the cruising kitty or boat budget, there are so many options—in materials, design, features, construction methods, etc.—and so many sailmakers to choose from, the decision-making process can be overwhelming. As with any major boat project, combining your own experience with research and the advice of a professional will go a long way toward ensuring you reach sailbuying nirvana.

To help you navigate the wide world of sail options, sailmakers, and sail buying, we've done some of the research for you and talked to the pros to get their input. The result is a three-part Sails e-book series. This first book focuses on sail-buying and mainsail options, but we like to start with a short anecdote from *Practical Sailor* Editor-at-Large Nick Nicholson following his Pacific crossing.

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### Across the Pacific

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The Pacific is a big, big ocean. After leaving Panama in mid-February, Calypso sailed just under 5,000 nautical miles before dropping the hook in Papeete, Tahiti, in early April.

The first jump took us just over 900 miles from Panama to the Galapagos. From there, it was take a deep breath and go for the big one: 3,100 nautical miles from the Galapagos to Nuku Hiva in the Marquesas. The 750 miles onward from the Marquesas to Tahiti seemed like a weekend sail after the long haul from the Galapagos.

#### PANAMA TO THE GALAPAGOS

The mostly light-air sail to the Galapagos was distinguished only by the tearing of the leech of our genoa, when the astounding veracity of the old saying, “A stitch in time saves nine,” became painfully apparent. If I had dropped the sail and made repairs when I first spotted the small tear in the leech tape, it would have saved a half-day of tedious hand-stitching required to re-attach about 6 feet of the tape to the sail.

To my dismay, I discovered on careful examination that the entire leech tape of the roller-reefing headsail—sewn

on after the application of a sacrificial layer of Dacron—was badly UV-damaged. There clearly must be a better way to do this.

Because this sail had been a disappointment from Day 1—its 135% overlap too big, and it set poorly for anything except reaching no matter how much you fiddled with sheet leads and halyard tension—we decided to invest only what was necessary to repair the sail to get us to New Zealand. At that point, it would become a very expensive drop cloth.

In the Galapagos, we had to find someone to re-stitch the entire leech and foot, as well as to apply small patches of sticky-back Dacron to portions of the tapes that were torn or chafed.

There is no sailmaker in the Galapagos. Instead, we found the only tailor with a big zigzag sewing machine. He re-stitched the leech and foot—matching the original sewing stitch-for-stitch, since he knew nothing about sailmaking—as well as applying about 20 small patches using our sticky-back. He did not have UV-resistant thread, so we know this won't last a long time. The 10 hours of labor he put into the sail cost us about \$55 US, and was typical of the price of almost everything—except diesel fuel and harbor dues—in the Galapagos. I got a pretty good \$2 haircut, too. They wanted \$30 for a haircut in Tahiti.

#### ON TO THE MARQUESAS

It's more than 3,000 miles from the Galapagos to Nuku Hiva in the Marquesas, and there's no place to stop en route. You just point the boat southwest, and go.

Since there's no way for a boat like ours to carry enough fuel to motor more than a small portion of this leg, you learn to be patient. In fact, we motor-sailed slowly for two days on leaving the Galapagos, heading much further south than the rhumbline to try to get quickly to the tradewinds.



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*Sails come in so many shapes and sizes, it can be overwhelming. We hope this e-book series will help guide you as you navigate the world of sail buying.*

The southeast trades proved to be almost easterly for our March passage, and varied in velocity from under 10 knots to 28 knots, with short periods of higher winds in squalls. We rarely saw more than about 24 knots of wind. Others behind us saw a lot more. It took us almost exactly 23 days for the trip—a fairly average passage for a 32-foot waterline.

We jib-reached at an apparent wind angle of about 120° to 140°, depending on the wind velocity, and waited for the wind to shift into the southeast. After about 1,800 miles, it was clear that this was to be the year of easterly tradewinds. It was time to bite the bullet and change from the relative comfort of broad reaching to the discomfort of rolling downwind.

Our biggest 24-hour run for this leg was 170 nautical miles, broad reaching in winds of 20 to 24 knots under single-reefed main, with the headsail rolled up to the size of a #3 genoa or working jib. The deck was completely dry in these conditions, with hatches cracked open for ventilation.

At the other end of the scale, our worst day's run was 97 miles in frustrating, variable winds and a big, wretched swell. We averaged about 5.5 knots for the great circle distance of just under 3,100 miles. Our actual sailing distance was about 150 miles further since we jibed downwind for the last 1,000 miles.

A slight current boost for most of the trip evened things out, so that our average of 131 miles per day is representative of what we do on passages where extensive motoring in light air is not practical. Our next boat will have a minimum range of 1,500 miles under power at a reasonable speed to help us through the light spots.

The boat was deliberately undercanvassed most of the time. We did not want to break anything, and we did not want to risk injury or excessive fatigue from postponing reducing sail until it was dangerous or difficult. The one time I violated this rule, I regretted it, ending up bruised, panting and sweating like a pig in my foul-weather gear. Reefing on a dead run is a lot harder than reefing when going upwind, even if it is drier.

This ultra-conservative approach probably added at least a full day to the trip, but it greatly reduced the workload in handling sails. Our next boat will definitely have a stowing mast or boom—probably electrically-powered—plus headsails on electric or hydraulic furlers, or at least an electric winch for assistance in reefing. A big Mylar reacher on a furler—a rig carried by a number of Whitbread 60s—would also be a plus. The Sundeer 60 Reunion, which followed the same track as Calypso—albeit faster—had this kind of reacher, and used it very effectively. They used the reacher alone for days on end on this route, and averaged almost 160 miles per day without pressing.

Only a few boats sailing this leg at the same time used conventional spinnakers or cruising spinnakers. Although the wind angle was about right, neither the direction nor the velocity of the Pacific trades is constant. Using the chute is not a set-it-and-forget-it proposition, particularly when the time comes to snuff the sail in a squall. In lighter conditions, when you might feel fairly comfortable single-handing a spinnaker, the big, sloppy seas can make flying the chute a frustrating task—more trouble than it's worth.

## ON TO TAHITI

We planned on stopping in Rangiroa in the Tuamotus on our way to Tahiti, but our timing was bad, putting us off the entrance to its pass at 0300 in a blinding squall. We carried on to Papeete, Tahiti.

Threading your way through the atolls of the Tuamotus is easy with GPS, but would have been staggeringly difficult just a few decades ago. We saw substantial, unpredictable currents, and experienced heavy rain squalls that totally eliminated visibility. Without the sun or stars for three days, sextant sights were impossible.

We passed through most of the Tuamotus at night, with a zigzag course through the widest passages. We never saw land, although on two occasions in daylight we were within 6 miles of atolls. It is a little spooky, to say the least. Being only a few feet above sea level, the islands do not show up on radar until it's almost too late. Every coral atoll looks pretty much the same, too, unlike high volcanic islands such as the Marquesas.

This is a place for good piloting and navigation skills, accurate log-keeping, properly calibrated instruments, and a good GPS. You also want to have your handheld GPS ready to go in case of power failure.

Beam reaching in decent breezes, we averaged 155 miles per day for the 760-mile passage to Tahiti. Heavy rain hid that island until we were only five miles off, and we experienced the strongest winds of our entire Pacific crossing when we should have had Papeete in sight.

The squalls finally lifted to show Tahiti startlingly clear before us. In just over six weeks, we had sailed a distance equal to more than 20 percent of the earth's circumference. By sea, our starting point, Newport, R.I., was 8,000 miles behind us.

We'll summarize our Pacific crossing in eight words: got bored, got wired, got scared, got tired. But we learned an awful lot.

By the way, the brie and croissants are really, really tasty in Tahiti, and a decent Medoc tastes at least as good here as it does in France, even if it costs twice as much. ▲

# Chapter 2

## Sailmakers

### *Lofts at a Glance • Sailmaker Advice and Estimates • More Sail Lofts*

Trying to pin down the technology, trade names, and jargon that define contemporary sailmaking is more than daunting—but it must be done once in a while, even if accuracy is fleeting. *PS* checked in with representatives from the major sailmaking labels in the U.S. to see what's available these days for recreational and cruising sailors. (We'll speak here only of mainsail and upwind headsails.)

The companies that make and market sails usually segment their consumers (and thus their products) into two general realms—racing and cruising—with the former normally garnering the lion's share of R&D resources as well as the marketing muscle. This situation, however, appears to be in flux as more sailmakers are acknowledging the existence of a vital market among cruising, or less racing-oriented sailboat owners. That's great news for the non-racing sailor, as these companies attempt to arrive at innovative approaches for sails that hold their shape longer and offer good performance along with a broad range of adjustability.

What's important about good sail shape? As one sailmaker likes to explain it, using poorly shaped or blown-out sails is like driving on bald tires. You're pretty sure your car will take you from A to B, but you won't be able to turn well or stop promptly, and your enjoyment of driving will be diminished.

Before wading into these complex waters, it's good to know some essential terminology and understand a few basic concepts involved in sailmaking, so here's a quick primer.

Upwind sails are characteristically built in two ways, either by crosscut or composite construction (often referred to as laminated sails). Crosscut sails are essentially built of woven polyester fabric (most often known by DuPont's trademarked name, Dacron) where the panels of cloth run from the luff of the sail to the leech. Composite construction can be achieved in several ways, but the objective is to align the load-bearing fibers of the main structural material (often referred to as the scrim) with the primary load paths of the sail. Doing this requires layering different materials, since mere woven polyester, with its strength primarily in the fill (or short axis) direction of the weave, won't suffice for more than modest loads and thus isn't sufficient in composite construction for sails that will be hoisted on boats over 20 feet.

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*To accommodate specific load paths in a sail, carbon "yarns" are spread Spirograph style from a computer controlled machine in a patented process at Quantum Sails in Cape Town, South Africa.*

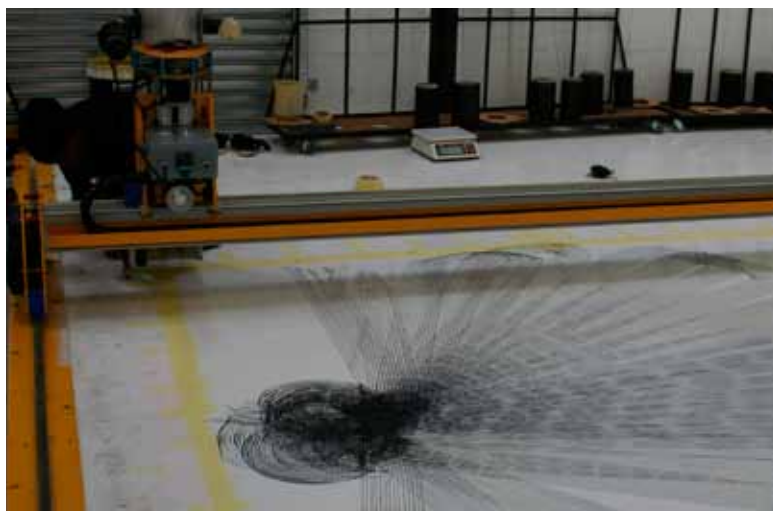
Regardless of the sail or sails you consider, don't just nod when a salesperson tells you what's best for your boat—get them to tell you why it is that he or she is specifying a particular material or construction method, and you'll ultimately have a greater sense of satisfaction regarding the product you purchase. Now for the overview.

### **NORTH SAILS**

Often seen as the industry's 800-pound gorilla, North Sails offers an extensive range of products and services through its franchise system, with a network of 40 loft facilities in Canada, the US, and the Caribbean alone. This company markets no less than seven products targeted at recreational and cruising-oriented sailors, ranging from the proprietary NorDac 4800 series of mainsails and genoas to the high-tech Marathon 3DL laminated sails.

According to Dan Neri in North's cruising sail development department, in-house research has brought about some important advances. "It used to be that the least expensive sails were more durable, but not equal in performance to the more expensive sails," he says. "Now almost all sailcloth products essentially give you equal durability, but they don't give you equal shape-holding ability, and that's the big difference." In general terms, says Neri, the more you spend now, the better shape holding you're going to get.

North builds its inexpensive sails out of NorDac 4800, a material woven from Dacron fibers that the company buys from several sources and then sends to a mill, specifying the parameters of the weave to create a proprietary product. NorDac 4800—available in weights from four ounces to nine ounces (per square yard)—is used to build mainsails and headsails. Though it's advertised





*Fabric choice is a major player in determining a sail's performance ability and durability. (Photo by Ralph Naranjo)*

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as “tightly woven cloth,” the weave isn’t as tight as that in the company’s next step up—Premium NorDac. The latter is woven from “high-tenacity” Dacron, which means it will stretch less than the fibers used for NorDac 4800. This ultimately translates into longer shape retention. North promotes this cloth as the most tightly woven Dacron fabric in the world.

Neri explains that the polyester fabric used to make most cruising sails these days is impregnated with resin. With a more tightly woven fabric, you don’t have to use as much resin. A less expensive cloth gets most of its bias strength (resistance to stretch on a diagonal) from the resin, whereas the more expensive cloth derives more of its strength from the weave.

The next step up is a laminated fabric the company calls Soft NorLam, which is assembled with a Mylar film in the middle of two woven Dacron layers. This is where the oriented construction begins within North’s product line. For larger boats, the company offers a range of fabrics using woven Spectra layers laminated on both sides of the Mylar film. (Spectra is a polyethylene fiber produced by Allied-Signal. It has tremendous initial resistance to stretch, but does elongate over time with constant stress.)

For shape holding, says Neri, NorLam is superior to the best Dacron products, as it doesn’t have the resin in it to break down. North pushes this cloth for many of its recreational or short-distance cruising customers, he says, because it can be rendered lighter than Dacron for that same application, and retains its shape so much better than other cloth.

For roller-furling headsails, North markets a Soft NorLam sail it calls the RF2, which it says is especially suited to this application because stronger fabric is concentrated in the leech and the foot areas, using panels of varying weights.

The lightest NorLam cloth uses 5-oz. Dacron laminated to Mylar. The heaviest uses 10 oz. of woven Spectra or Spectra and carbon for megayacht applications. According to Neri, NorLam has a big advantage over Dacron panels because it stays relatively stable on the bias until it ultimately yields, while Dacron used without any additional structure will distort gradually over time.

“Longevity is totally dependent upon how the boat is used and where,” he explains. “We’ve found that customers who really work their sails get about four years out of laminated sails, and at the end of that period, the sails are essentially shot. If the same customer had Dacron crosscut sails, he could milk those sails for roughly seven years. The big difference is that at the

end of three or four months with the Dacron sails, you’ll have the same shape that the Norlam sails will have at the end of about three years. That’s essentially why sailboat owners who make the move to composite sails just don’t go back to Dacron.”

The higher-end headsails and mainsails offered by North—specifically for long-distance cruising sailors who value sail shape and performance—include the company’s trademarked Spectra/Dyneema material, used when light weight and low stretch are the prime considerations, and Marathon 3DL, North’s marquee product for high-end cruising inventories.

Many sailors are familiar with North’s 3DL process, in which laminated sails are built on a large mold with yarns laid out and sandwiched in between layers of film to carry the primary loads. Neri says that a Marathon 3DL sail is basically a 3DL sail sandwiched between Dacron covers on each side. The sails are protected, says Neri, by their oversize yarns. “Even if the sun breaks down all the UV inhibitors and blockers we use, and cooks the outside of the yarn, the core of the yarn retains its strength.” He explains that the largest yarns used in woven Dacron sails are 500 deniers (a measurement used to specify the weight of a yarn). The yarn used in a 3DL sail is a 1,700 denier yarn, “which is really why these sails don’t rot or break.”

For the strength in its 3DL sails, North primarily uses Vectran yarns, which Neri admits doesn’t have the best resistance to UV degradation, but holds up because of its size.

The outer layers of Marathon 3DL sails are made of a proprietary product North calls TF, which is a customized 1.7-ounce NorLam taffeta/film developed expressly for this application. Neri says that the TF film not only protects the internal fiber matrix of the sail from chafe, puncture, and UV degradation, but combats off-axis stretch and contains double the usual amount of titanium dioxide UV screening agents, plus a fungicide to discourage mildew growth.

Neri admits that the Marathon 3DL sails are more expensive, perhaps by 30 percent, but he offers the following perspective on that issue: “It seems like misplaced economy to save whatever the difference is by buying a Dacron sail and have what turns out to be a poorly shaped airfoil for most of the sail’s life. When you weigh that gain against the total amount of money you spend to enjoy your boat, you might as well have a sail that retains its shape and consequently makes the boat faster, makes it not heel over as much, and is easier to hoist, reef, and douse.”

## QUANTUM SAILMAKERS

Dave Flynn, a salesman and sail consultant at Quantum’s headquarters in Annapolis, Md., is keen to distinguish his company as a custom sailmaker. “Quantum builds sails for a very broad spectrum of clients,” says Flynn. “We build everything from grand prix sails to Optimist sails. In general, we build engineering-intensive products that are high quality, and we tend to attract customers who are a little more demanding due to custom issues.”

Now entering its eighth year, Quantum is a young sailmaking company. Roughly 50 to 60 percent of the sails this company builds are crosscut Dacron, which, as Flynn points out, is still a relatively cost-effective way to fabricate sails. But Quantum’s

specialty is composite-built sails.

“Cruising sailors in general hate to hear the word ‘performance,’” says Flynn, “because it denotes racing. But performance is really important for cruisers because it’s about good sail shapes that offer better control of the boat. For Quantum, that’s where better materials and stronger, less stretchy sail construction comes in.” Flynn says that both composite and crosscut construction will produce sails that last long, roughly 3,500 hours, “but composite sails have a longer life as a critical airfoil...in rough terms you gain probably two to three times in the shape life of a sail by going with composite construction.”

According to Flynn, all composite sails are made using the same basic structure—large oriented fibers that do most of the work and a piece of Mylar film sandwiched between two woven layers of cloth. “Many cruising boat owners have a hard time accepting Mylar, but Mylar is nothing more than polyester extruded in a sheet. The reason to use it is that it is equally strong in all directions. When you take this film and stick it in a composite laminate, you achieve bias stability.” What really differentiates one product from another in the market, says Flynn, is the structure inside the laminate.

For its cruising customers, Quantum offers three choices of structural yarns in the composite sails it builds: Polyester, Spectra, and Vectran. The lower end in terms of cost begins with Dacron fibers, which Flynn says can be used in composite applications to render sails that are slightly lighter than a comparable crosscut sail. These sails have the same flex and UV resistance as their crosscut cousins, but hold their shape much longer. Another polyester option is Pentex, a high-modulus yarn that has no greater flex, UV resistance, or durability than Dacron, but stretches two to three times less. According to Flynn, Dacron works well for smaller, lighter weight boats, Pentex yarns work well in sails on boats up to 45 feet, and after that customers are encouraged to buy sails built with Spectra, Vectran, or even carbon yarns.

Spectra is what Quantum recommends for high-load applications where performance and durability are required and cost is less of a concern. Spectra, however, is quite expensive, says Flynn, particularly in scrim form, and it does have two other drawbacks: it is subject to creep (it elongates under constant load) and laminates built with this fiber are particularly susceptible to mildew.

Vectran—a polyester-based liquid crystal fiber manufactured by Hoechst-Celanese—is heavier than Spectra, yet offers five times the stretch resistance of polyester. It also has great flex characteristics, but is more expensive and more prone to UV degradation than Spectra. It is also slightly heavier, so Quantum recommends Vectran in applications where weight is less of a concern.

Flynn says that Quantum will specify varying weights of the woven Dacron taffeta—the bread in the composite construction sandwich—depending upon the application (mainsail, headsail, etc.). Because any laminated sail is susceptible to moisture penetration, these layers are usually treated with an antifungicide to combat mildew. Quantum obtains this cloth from a variety of suppliers. “We do our own testing and analysis of sailcloth,” explains Flynn, “and we buy accordingly.” He says the company customarily purchases Dacron from Challenge Sailcloth, Bain-

bridge International, and Contender. “The reality in this industry is that cruising sailors are the ones who more often than not get stuck with the low end of any product line, because the perception is that they don’t know any better. And it’s almost impossible to tell the difference between a good, a mediocre, or a poor quality fabric unless you test it. So we differ from other sailmakers in that we only use the best materials. We don’t use any of the low-end fabrics.” This policy, Flynn admits, occasionally means Quantum’s products carry a higher price tag.

## UK SAILMAKERS

In business for more than 60 years, UK Sailmakers offers sails for nearly every facet of the sailboat market, but UK International’s general manager, Adam Loory, hastens to point out that the company prides itself on its custom sailmaking. “All our sails are custom-designed and custom-made for each customer. We don’t have off-the-shelf products, and we use our own proprietary design program to complement that service.” Yes, the company does have a franchise with a loft in Hong Kong that builds custom and OEM sails, says Loory, “but you can’t compare the OEM sails to the custom sails they or any other UK loft builds.” For the non-OEM sails, he explains, every prospective customer is asked nine essential questions about his boat and the kind of sailing he or she does. “Then you have to measure the boat so that whatever you design fits all the specifics of that particular boat. Sails really can’t be stock items. They have to be custom.”

Within UK Sailmakers’ worldwide group of nearly 40 lofts and sales offices, half of which are in the US, some franchisees cater to cruising sailors and some to racing sailors, simply as a factor of the given local market. Every loft can build woven Dacron crosscut sails, which make up the majority of the company’s cruising orders, but they can also create sails using a patented construction process that UK Sailmakers markets under the name Tape-Drive. “This is essentially a two-part construction process,” explains Loory, “where the skin that defines the sail shape is a separate element from the part of the sail that gives it strength and shape-holding ability.” He offers an analogy from the construction industry where “a traditional sail is sort of like a masonry construction process in which the walls define the shape and hold up the building. With Tape-Drive, it’s more like a modern office building where the structure is derived from a steel skeleton and the shape is provided by the glass curtain of walls.

“The idea behind the tapes is to have them oriented so that they run continuously between the three corners of the sail to handle the primary loads. On a 30- to 40-foot sailboat you’ll have anywhere from 30 to 60 tapes on a leech of the sail, which is a lot of structure. And most of the tapes we use have a breaking strength of around 1,000 pounds.

“The huge advantage for the cruising sailor,” continues Loory, “is that the Tape-Drive grid keeps any damage localized. If you get a minor problem with your sail while you’re out sailing—like a spreader tip poking through it—you can keep sailing without fear of the sail ripping.”

Loory explains that UK has been refining its Tape-Drive sails since the first one was built in 1984. He says that the Tape-Drive system offers UK Sailmakers a lot of flexibility regarding the materials used. “We can match the materials to the budget and



*Where and how you sail will help determine the design and construction requirements of a new sail. This Tartan cruises the Florida coast and the Bahamas, so its large, overlapping genny is a good choice for the mostly light-air, near-shore sailing.*

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## HOOD SAILMAKERS

If there's one company among the larger sailmaking firms that is truly invested in the non-racing realm, it's Hood Sailmakers. Headquartered in Middletown, R.I., Hood is distinguished in a number of important ways. First, this is the only company that has eschewed laminated sail construction, and it is one of the few companies that creates its own sailcloth, which it has since the early '60s.

Tim Woodhouse, president of Hood Sails, says his main focus, and the main thrust of the company's R&D, resides in two areas—woven polyester and Vectran. "As other sailmakers began moving into laminates several years ago, we went the other way," he says. "We found that we couldn't offer customers anything approaching a three-year warranty with laminated products, no matter what adhesive we used—and we're talking about a sail that would be roller-reefed. To me, that's just unacceptable."

Woodhouse explains that the company's cloth manufacturing division—Hood Textiles, located in Cork, Ireland—creates a fairly narrow range of fabric intended for use in durable, longer-lasting cruising sails. "Our facility manufactures a full line of woven, high-tenacity polyester sailcloth, which we only sell within our franchise system."

Woodhouse says that many sail-buying customers don't realize that there are three qualities of polyester fiber available for weaving sailcloth—low, medium and high-tenacity. "Consumers and a lot of experienced sailors don't know this," says Woodhouse, "but there is a substantial difference in the quality, durability, and stretch resistance of the fabric, depending upon what level of fiber it's been made of." He claims that the vast majority of polyester fibers on the market today are low-tenacity, and says that Hood only makes products from high-tenacity polyester.

"We also make a proprietary product that incorporates Vectran, which we call Vektron—it's essentially Vectran yarns commingled with the polyester."

Woodhouse labels Vektron a successful alternative to laminates. "It has significantly longer life than a laminate. It has the same longevity as a Dacron, but it is lighter and lower stretch than Dacron." One key advantage of incorporating Vectran, he says, comes from the material's high resistance to heat, which keeps it from distorting when the polyester into which it's woven is heated in the finishing process that almost all sailcloth is subjected to.

But saving weight and maintaining durability, says Woodhouse, is Vektron's chief advantage, particularly when it comes to sails built for larger vessels. Hood recently built a new Vektron mainsail for the 130-foot J-Class yacht Endeavour. It ended up almost 50% lighter than the boat's previous mainsail. "For a more common boat, say one that displaces 15,000 to 20,000 pounds, we'd probably specify 9-ounce Dacron for sails, but in Vektron we would use a 7.7-ounce material. Of course this would be for

performance demands of a customer. We can make a Tape-Drive sail with a polyester laminate or a Kevlar laminate, both of which are less expensive than Spectra. And the tapes can be reinforced with Kevlar, carbon, Pentex, or fiberglass yarns."

According to Loory, the company buys its laminate materials and Dacron from Dimension Polyant, Bainbridge International, and Challenge Sailcloth. Some of the tapes it uses are actually fabricated at UK lofts. "We make a point of staying on top of the research and design issues, so we give the supply companies a little competition this way."

To cater to the cruising market, UK Sailmakers produces what it calls a Passagemaker genoa in two different constructions—Dacron and Tape-Drive. Each incorporates roller-furling with a UV cover, foam luff, reefing reinforcements on the foot and leech, and each is fitted with marks aft of the tack so that the user can achieve the proper settings when furled. "For roller-furling sails we make our UV covers sacrificial. They're put on last and they even cover the webbing for the rings. This makes the cover easier to service and replace once it wears out."

Again for the cruising market, UK Sailmakers offers a mainsail it has dubbed the Batmain. These sails are also designed and built in either crosscut or Tape-Drive configurations with full-length battens, which Loory says offers three important advantages: the sail holds its shape more easily, it lasts longer, and it's easier for the user to handle. He also points out that full-battened mainsails tend not to slat when a boat rolls in light air and large waves, and they offer better projected area downwind by supporting the leech of the sail. The company also builds roller-furling mainsails.

UK Sailmakers' most advanced cruising sails are called Platinum-Drive sails, made of a Spectra laminate with Kevlar or carbon fiber tapes in the Tape-Drive configuration.



a guy who wants to go world cruising, and he'd get about 30,000 to 40,000 miles out of either sail with routine maintenance in stitching and seams."

Woodhouse says the original Vektron sails that Hood built back in 1992 are still being used. "We've had no instances of the fabric failing. Very few people have put in that number of hours on laminated sails and are still using them."

Woodhouse allows that a Vektron sail is roughly 15% more expensive than the Dacron alternative that his company would build. Nevertheless, Vektron products make up half the sails Hood now builds.

Not all the lofts in the Hood franchise system follow Woodhouse's philosophy regarding woven fabric sails vs. laminate sails. "Some of our lofts have a greater percentage of racing clients, so they're working with laminates in the dinghy and one-design areas," he says. Those lofts are free to purchase sailcloth through the four main industry suppliers (Bainbridge International, Dimension Polyant, Challenger Sailcloth, and Contender), a factor Woodhouse believes offers them flexibility in the marketplace. Nonetheless, his opinion remains the same: "When you start asking customers what their expectations are for the longevity of a sail, some of them haven't thought about it. Racing customers in particular have become accustomed to diminished expectations in this regard. They speak in terms of hours, not days. Unfortunately, the longevity of racing sails has gone down, not up, with new laminate technology. Our products are addressing through R&D what the average sailor out there wants and needs, and to me that's better performing, more durable sailcloth. I just don't think we can get there with laminates."

## NEIL PRYDE SAILS

The name Neil Pryde might draw more recognition as a maker of windsurfing sails and an OEM supplier, but the company is also a strong player in the custom cruising and recreational sailboat market. According to Managing Director Tim Yourieff, who operates out of the US corporate headquarters in Milford, Conn., "Most of our sails are built for cruising boats. Our true niche is really performance cruising."

Making the transition from being solely a mass producer of sails for boat builders to a custom sailmaker required that the company retool its approach to sales and production, which Yourieff says included developing a renewed understanding of the importance of communication with the user. "We clearly delineate the type of products we offer so that we can direct the customer to the sail that's suitable for their application."

This philosophy led to the four distinct lines of sails offered by Neil Pryde Sails: Performance Cruise, Cruise Plus, and Cruise, as well as sails designed and built expressly for less demanding, recreational boats, called Inshore sails.

The majority of Neil Pryde sails are cut and assembled at its massive facility in China, which company literature touts as "the largest centralized sail loft in the world." Yourieff explains that this helps his company maintain the highest construction standards possible. "We're able to put a lot of detail in the sails because we manufacture them in a central facility."

However, all the design work is done in the US, and all materials originate here as well. To interact with and service its

customers, Neil Pryde Sails has a system of 30 lofts worldwide, all of which are sales centers and some of which are service lofts.

The company's entry-level product—the Inshore line—says Yourieff, is for weekenders or daysailors, but essentially not for boats over 25 feet. These sails are ordinarily single-ply, crosscut Dacron sails of up to 6.5-oz. cloth, with plastic headboards, a single row of stitching, and no frills. "We get our Dacron from Challenge Sailcloth and from Contender," he says, "and we don't cut corners on the fabric—it's all high-tenacity Dacron."

The next step up for cruising or non-racing customers is the Cruise line, which also means crosscut Dacron sails (built of either Challenge's High Modulus or Contender's Super Cruise fabrics) that the company advertises as "inshore cruising sails designed to handle additional offshore use as well." These sails are single-ply panels reinforced in the highest load areas with "block" patches (not radial). They also have heavy-gauge aluminum headboards with stainless steel liners and hand-sewn slugs.

Then, by opting for what the company calls its Tradewinds specifications, customers can get what charterboat clients get—heavy reinforcements on almost every aspect of the cloth, stitching, and hardware. Yourieff labels these "truly the best value cruising sails on the market today... We've had guys do circumnavigations with the Cruise-level sails. I wouldn't recommend that specifically, but they're good sails."

After that comes the Cruise Plus line, which are also crosscut Dacron sails. "The biggest difference here," explains Yourieff, "is that we two-ply the leech and the head and all the reinforcements are radial. And the sail numbers and insignias are included in the price." These sails, he says, are really intended for the blue-water sailor.

Though the Cruise Plus sails have many standard features, the rollerfurling headsails in this line don't come standard with foam luffs or UV-resistant sail covers. Like all the company's sail products, these carry a two-year warranty for work and materials.

Neil Pryde's top-of-the line sails for cruising customers are built as Performance Cruise sails. These are laminated, tri-radial sails, and it's in this realm where the customer choices are the broadest. These sails are generally sandwiched inside a Dacron taffeta, though occasionally the taffeta is just on one side. This is intended to protect the scrim fibers and the film from abrasion and UV degradation. Yourieff points out that customers have a number of choices regarding the fabric—polyester, Pentex, or Spectra.

## HALSEY LIDGARD

Paul van Dyk, the special projects manager at Halsey Lidgard Sailmakers in Mystic, CT says boats in the 30- to 60-foot range comprise his company's core market. "We occasionally make sails for smaller one-designs, and we've definitely developed a specialty as a sailmaker for megayachts (including sails for Play-Station and Team Adventure), but our principal customers own midsize boats."

Regardless of the nature of the boat, van Dyk explains that the constant that links every product Halsey Lidgard makes is the extent to which the base materials are tested. "We own some pretty sophisticated testing equipment," he explains, "and we can test every kind of fabric that is available." The company uses an

Instron testing machine coupled with custom-designed software to collect data regarding the cloth sample at a rate of 2,000 data points per second. He says this same testing system played a key role in developing the famous Cuben Fiber sailcloth for Bill Koch's 1992 America's Cup campaign.

According to van Dyk, what customarily happens before an order is processed is that his colleagues specify a particular material to their suppliers and then put that cloth to the test. "We get a lot of cloth in and we go ahead and test it for breaking strength and stretch. We do that with almost every lot." Generally the company purchases its cloth from Dimension, Contender, Challenge, Bainbridge, and Cuben Fiber, he says, with all the testing done at the Mystic, CT loft that Andy Halsey founded in 1983.

Halsey Lidgard produces both crosscut and triradial-built sails, but van Dyk is quick to stress that the company's sails are distinct for two reasons—the proprietary design program developed by Jim Lidgard, and the experience of the personnel involved. SailMaker, the software that Lidgard developed in 1984, allows the company's designers to create sail shapes on screen in three dimensions, after which those parameters are fed to a laser cutter that creates the panels. Van Dyck says 160 other sailmakers around the world now use this program. To set up panel orientation in sail designs, the company uses Relax, a stress-analysis software program designed for the sail-making industry.

When it comes to experience, van Dyk says that his background serves as a typical example of what Halsey Lidgard looks for in one of their staff members. He's done 11 transatlantic crossings and has sailed around the world. "We have a great many hours of sailing," he says of the collective time on the water logged by the staff at the company's five lofts around the US. "We've all done a variety of sailing, and regardless of the sail we're building, we use all of our practical knowledge to arrive at the best solution for design and construction. We don't differentiate too much between the sails for an 80-footer and those for a 30-footer. We put the same resources into each sail in terms of quality, and we take extra time to put them together."

Halsey Lidgard's sailmakers compare the actual sails with the original computer molds by way of digital imaging. They do this by feeding high-resolution photos of the sails into the design computer and measuring them with program known as SailShooter, another technological tool derived from the America's Cup arena.

According to van Dyk, for several years the company has produced inventories for numerous high-end clients, which always requires the optimum design, materials, and execution. These extreme custom projects regularly involve the use of Cuben Fiber, considered one of the most advanced sailmaking materials on the market, and thus Halsey Lidgard has amassed ample experience in this area. That knowledge, says van Dyk, translates to the work the company does with all its sails. "Some boats might be cruising vessels," he explains, "but if they're large, you address the design and fabrication issues the same way you would for racing boats. We do specialize in larger vessels, and within this range we build sails for cruising, offshore, racing, and grand-prix boats."

## DOYLE SAILS

Like many sailmakers, Doyle Sails offers several product lines identified by marketing trade names. Bluewater Sails, DuraSails, 2+2 mainsails, and QuickSilver Genoas comprise Doyle's lexicon of labels for the cruising customer. But these labels are simply a point of departure, says Mark Ploch, a franchisee who owns Doyle lofts in New York and Clearwater, FL.

"We're a custom sail loft, and every sail, just like every owner, has a unique set of needs," explains Ploch. "If a guy owns a Catalina 30 on Lake Lanier, he's not going to need a Bluewater style sail. We'd probably lean in the direction of a DuraSail for that customer, but we'd make some important alterations, like not building as much roach into his mainsail as we would for the same boat in Southern California. And the clews on any headsail, whether we specified a QuickSilver genoa or a sail built with Doyle Vectran, would automatically be raised for better visibility. After that, if the client didn't have specific preferences, we'd build the sail along the lines of our normal DuraSail standards."

Doyle Sails, which has been in existence for almost 40 years, has 20 lofts around the US. The company's basic non-racing product is its line of DuraSails. These are crosscut Dacron products—both mainsails and headsails—without any of the costly frills included in the company's other products. This, says Ploch, results in a good sail value for small- to medium-sized boats. DuraSails are offered with a three-year warranty.

Doyle's next line is called Bluewater Sails. These are essentially crosscut Dacron sails with a finish and details that step them up from DuraSails. For instance, these sails are built with the reinforcement needed for ocean passages, including larger patches that are usually triple-stitched; heavier taped edges, Spectra webbing, and lower-stretch leech lines. Depending upon the usual factors—the kind of sailing a customer does, his or her sailing locale, and that person's expectations regarding the longevity of the product—Ploch says he and his colleagues will specify a certain weight of high-tenacity Dacron. He explains that the warranty Doyle offers on its Bluewater Sails is based on details like the luff slides being sewn on with webbing, the batten patches being reinforced, all the seams being taped as well as stitched, and having large radial patches applied to reinforce the high-load areas like clews and heads. All of this, says Ploch, is standard construction protocol at Doyle lofts.

Stepping up from there, the cruising product line moves into the QuickSilver Genoas and 2+2 Mainsails. The claim that Doyle makes regarding its QuickSilver II headsails is that they offer "the low stretch of laminates with the durability of woven Dacron" at a lesser price. The 2+2 Mainsails, which can be built either of woven panels or laminated fabrics, are intended to satisfy customers who both cruise and race. The idea here, says Ploch, is to achieve product durability with two full-length battens in the top of the sail and adjustable sailshape with two longer-than-normal battens in the lower portions. Doyle also offers a proprietary product for roller-furling mainsails that it calls the "Doyle Swing Batten," which is a rigid batten that can be articulated by way of a control line to align vertically for furling or horizontally for sailing.

What sailcloth does Doyle specify for its sails? "We actually use a lot of the latest racing fabrics in many of the cruising sails we sell," says Ploch. "We find that cruising sailors are oftentimes the

more challenging customers because they really demand more of the product than a racing sailor. So even though Dacron is probably the material we use most in bulk terms, we use a lot of composite construction materials in our cruising sails. We also build a lot of megayacht sails, in which we often use our new Ocean Weave, and in some cruising sails we're beginning to see an application for our new D4 product."

D4 is a laminated cloth with the base fabric assembled in the Doyle Fraser facility in Australia. It has yarns laminated in between layers of film or fabric, says Ploch. "We specify different components depending upon the order, so in this way the sailcloth is constructed around the needs of the boat." Also among its high-end products, the company offers sails built of a fabric it calls Doyle Vectran, which incorporates Vectran in a laminate between two layers of taffeta that is then cut into a traditional tri-radial sail.

Ploch is keen to stress the importance of tailoring the product to the customer's needs. "It works best that way. With a little information, we can put that person into the most appropriate sail. We can design the inventory to his needs. And honestly, that's the kind of customer that we deal with a lot. Our market is very service-oriented and our buyers are sophisticated."

## CONCLUSIONS

That's a lot of marketing lexicon and tech-talk to absorb, and there's some hype in there, too. But there are obviously a lot of similarities: None of these major sailmakers takes customer service lightly. Anywhere above the basement level, customers can expect personal attention and methodical systems in place for determining the right materials and construction techniques.

There seems to be a consensus that woven-only sails will last longer, but will lose their top efficiency relatively early, while laminated sails will hold their designed foil shape longer, but not last as long overall. Standing outside that consensus, with a venerable company track record to back him up, is Tim Woodhouse of Hood.

The major remaining concerns, in order of importance to us, thinking in cruising terms, would be: first, long-term customer service; second, overall durability, meaning resistance to UV, flogging, mildew, poor folding and flaking, and stress at the corners; and third, general shape-holding ability. Oh...and cost.

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## Sailmaker Advice and Estimates

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We asked all our interview subjects to price out a suit of sails (mainsail and 150-percent furling headsail) for our hypothetical No-Name 35, a 10-year-old, 14,000-pound, single-spreader sloop, which we keep in New England in the summer and take to Florida in the winter. We rarely race the boat, go offshore about four times a year, and often sail in the evenings with the family. We told them that sailshape and performance were important.

We were aware that we were throwing the sailmakers a bit of a curveball with this request. Not all of the requirements dovetailed with the others. Nevertheless, we were interested to see what would happen. Before we let you know what each

had to say, we thought we'd give you a quick primer on sail plan measurements:

**I** — the distance from the point where the topmost jib halyard (and usually the headstay) meets the mast, to the deck at the sheerline (not the top of the house).

**J** — the distance from the point where the headstay meets the deck to the forward face of the mast, at deck level.

**P** — the length of the mainsail luff, from the head of the sail to the gooseneck fitting (or, on some racing boats, between black bands).

**E** — the length of the mainsail foot, from the clew of the sail to the gooseneck fitting (or, on some racing boats, between black bands).

**LP** — the distance from the clew of the headsail to the stay it's set on, when the line between them is perpendicular to the stay. Note how the LP will vary when the clew of the sail is moved up or down.

Now, what they had to say:

## NORTH SAILS

Dan Neri wasn't convinced our scenario represented a realistic customer and addressed his response in this fashion: "The customer doesn't sound like a real boat owner, or if he is one, he needs some help figuring out what he wants to do with the boat. If I got this inquiry, I would call the guy and work him through to a more honest assessment of what he needs before offering a price or recommending any products.

"First, nobody cruises from New England to Florida. A 35-foot boat like this would maybe go to Maine once a summer, or to the Elizabeth Islands or Block Island a few times, and it would not use its racing sail for those trips. So it is unrealistic to say you are buying a sail for some racing and mostly cruising. Also, you wouldn't want a 150% genoa for offshore trips. A cruising sail, or any sail designed for offshore use, should have a relatively high clew. A higher clew allows you to vary the sheet tension without moving the lead. With a low-clew 150% designed for racing, the lead has to be moved forward and outboard as soon as you ease the sheet, which isn't practical on a cruising boat. Also, you can't see anything under it and water can't get off the foredeck, so the sail is stressed (and stretched) along the foot when the bow drops into waves. When you raise the clew the overlap with the mainsail increases. So you would want to raise the clew and then shorten the LP to keep the overlap the same. And if you're really going offshore with this as the primary headsail, you'd want to shorten the LP some more to get a greater upper wind range. In an ocean cruising environment, I've found that you're either happily motorsailing and enjoying the flat conditions, or you are depowering to keep the boat flat. Those glorious 12- to 14-knot days only happen in magazine stories.

"If the headsail is to be a roller-furling sail, the higher clew is again better because it allows the sail to roll up without the foot piling up and it allows you to roller reef the sail and still have the sheet lead to the jib track car. I usually help the customer figure out how much overlap he wants between the mainsail and headsail as step 1. Then we make the clew height so the sail sheets to the back of the genoa track fully unrolled.



*One of the many choices you'll be faced with is selecting sail-handling hardware: batt cars or slug slides? One reef point or two? Luff foam or none?*

“You should definitely cover the sail while it's not in use, especially in Florida. You may wish to consider our Lazy Bag cover for this.

“For the genoa, In addition to an Acrylic UV suncover, I would strongly suggest fitting the sail with our Multi-Track foam luff system. This option helps to reduce sail draft when the sail is partially furled in order to maintain a reasonable shape when reefed in strong winds.”

**Mainsail** (Cruise Plus; standard roach—317 sq. ft.) Fabric—8.3-oz. Challenge High Modulus Dacron: \$1,951.48. One reef: \$146.35. Full battens (four): \$194.97. Lazy Bag sail cover (stock color) \$611.68. Total mainsail cost: \$2,904.

Storm Trysail (67.55 sq. ft.) Fabric—9.0-oz. ounce, orange. Total cost: \$685.

**Headsail** (Cruise Plus, LP 150%, with two-ply head and clew, 545.69 sq. ft.) Fabric—6.9 ounce Contender: \$2,622.16. UV Suncover (stock color): \$298.02. Multi-Track Foam Luff \$195.58. Total headsail cost: \$3,115.

## HOOD SAILS

Tim Woodhouse and Joe Cooper offered a detailed quote that began with two fabric options for a mainsail: either 7.5-oz. Hood woven Dacron or 6.0-oz. Hood woven Vektron. Woodhouse says: “I would recommend the Vektron for the mainsail for performance, durability, and ease of handling, as well as a so-called softer hand. This is a term textile guys use to describe the softness/firmness of a material.”

**Mainsail** (includes a club race roach at 303 sq.ft.) Option 1: 7.5-oz. Hood woven Dacron. The sail incorporates four standard E-glass and epoxy RBS battens; batten pockets fabricated in a separate step and completely closed to separate the batten from the body of the sail; two rows of five-step stitching; slug slides or boltrope on the luff and foot as desired; leech line operable at the clew and each reef point; Hood patented press ring in the clew; standard aluminum headboard, telltales, four sail ties, and a bag. Price: \$2,337. Other choices for racing and coastal sailing include two reefs, cunningham eye, foot shelf, sail numbers, draft stripes, and insignia for \$633.

Option 2: 6.0-oz. woven Vektron (all else the same). Price: \$2,420.

Woodhouse and Cooper say full battens are indeed an option, but they didn't deem them necessary. The additional cost would be \$470. “If the spar has an internal round slug track section, this does not lend itself easily to low-friction operation with the additional compression generated by full battens. You may also then have to look at proprietary batten receptacles and so on, so the price goes up—but we're not convinced the value goes up with it.”

That gives you the greatest range for roller reefing before the sheet lead runs off the front of the track. Also, if you want to use the sail wing-and-wing for downwind sailing, it should have an LP of about 125-130 percent, based on a J-length pole. You can roller reef a larger sail to work on the pole, but in that case you lose luff length and quality of sail shape.

“If it were my boat, I would buy a fully battened Marathon mainsail with two reefs and five battens and an Antal luff track system. I would add a very simple lazy jack system made out of 3-mm Spectron 12 cord—no blocks or cleats, just the cord permanently tied in place in a fixed location, left up for racing and cruising. And I would add a roller-furling Marathon genoa, about 135 to 140 percent LP, with about a three-foot clew height.

“To make this a more racing-oriented sailplan, the mainsail would be built with two full battens and two shorter, lower battens. It would not be as easy to reef and the sailshape would degrade sooner, but the sail would be a little more adjustable and easier to trim when hard on the wind. The headsail could be made larger on the LP and lower-clew for better race performance. In that case, you would also want a small racing jib for conditions over about 15 knots.

“Depending on the boat, you could consider a more radical change and try to set the boat up with a larger roached mainsail and a non-overlapping primary jib. That setup has plenty of advantages for easy sail handling, but suffers in the lighter winds.”

Neri supplied quotes for a mainsail of 8-oz. Dacron with two full-length battens and two reefs: \$2,105. For the headsail he specified a 140% genoa of 7-oz. Dacron, with UV leech and foot, and a rope-luff reefing pad with reefing patches: \$2,852.

## NEIL PRYDE SAILS

Tim Yourieff recommended his company's Cruise Plus range of sails. “This construction standard is specifically designed for sails that will see bluewater offshore sailing, which you will encounter between New England and Florida. For the mainsail, I would recommend a full-batten sail, as this tends to greatly reduce sail flogging and therefore increases the sail's lifespan. For offshore sailing, I would recommend three rows of reefs, or two rows and a storm trysail.

**Headsail:** “We’re of the opinion that the 150% is too big for this boat and its stated use. We would really recommend the customer consider a sail closer to the 135% size. We also wouldn’t recommend a roller-furling genoa for the stated purpose. It is too light, and though all sorts of characters have sailed all over the place with only one headsail on a furler, we consider that practice extremely poor seamanship. So we’d specify a 135% roller-reefing headsail (484 sq. ft.) designed slightly flatter for greater utility as the sole headsail.” Fabric: either 8.0-oz. Hood woven Dacron or 6.0-oz. Hood woven Vektron. The sail would have a luff tape, telltales, UV sunshield, foam luff pad, reinforcing at the head and tack to accommodate reefing strains, reef memory marks on the foot, leech, and foot lines, Spectra webbing in head and tack, Hood press ring in the clew, and a bag. Total headsail cost: for Hood woven Dacron, \$3,523. For Hood woven Vektron, \$4,104.

Cooper and Woodhouse say that while the price of the Vektron sail might appear high, if one compares this sail to a laminated sail of equivalent service and performance, with a high-modulus fiber as the load-bearing fiber, the Vektron sail will be less expensive and more durable.

## **HALSEY LIDGARD**

Paul van Dyke had several suggestions, including a novel approach to the headsail issue. For a mainsail, he recommended using 8.3-oz., high-aspect Dacron—“This material is maintenance-free and bulletproof”—with two reefs, one at 12% and the second at 30%. “The second is deeper than usual, so the boat will handle well in a gale with the deep reef and a storm jib. Four full battens will dampen flogging and extend the life of the sail.” Price: \$2,696.

For a genoa to be used in the lighter winds of summer as well as the occasional race, van Dyke recommended a 150% polyester laminate with a furling cover. “This sail will be lighter weight and higher performance than crosscut Dacron.” Price \$3,475.

He also offered this observation: “The boat has quite a large J dimension, so it is difficult to get one headsail to do everything. With that in mind, here’s a further headsail option: An 8.30-oz. crosscut Dacron sail at 125%, with roller-reefing patches and a rope luff. This sail has very little low-end range and probably does not start working well until 12 to 14 knots of true wind. But if you did not want to change headsails on long offshore passages, it would be an effective sail. Plus, it can roll down to an 85% in sail area.” Price: \$2,507.

“Another sail to consider, especially for offshore work, is an upwind staysail set on an inner forestay. This sail is easy to handle because it remains hanked on the stay. It works quite well as a double-head rig configuration for reaching, and can be used alone as a storm jib. We would use 7.3-oz. Dacron. You’ll have to install the inner forestay. Price: \$860.

## **DOYLE SAILS**

Mark Ploch suggested two options for mainsails and headsails. He says the Dacron/Mylar combination mainsail would be great for the more modest budget. The D4 option is “Doyle’s best product, and gives you the best balance of performance and durability.”

Regarding headsails, Ploch offered both the QuickSilver II

genoa and a roller-furling sail. He also offered this important caution: “We feel that something in the neighborhood of a 135% headsail is a better sail for the cruiser than a 150%. Most of the time they’re not sailing with a crew stacked on the rail and they’re usually less concerned about boatspeed when there’s under six knots of true wind than they are about heel in 15-plus knots.”

Ploch’s quote includes a foam luff on the headsail, but he says that he tries to talk most of his southern customers out of this option for two reasons. “The foam luff does indeed help flatten the sail as it rolls in, but you will always have a sail that is compromised. When the sail is rolled up, it is sitting behind that fat roll, and when it is totally unrolled, the foam luff makes a thick leading edge, which is hard to read. And, in the warmer southern climates, mildew is an issue within the foam.”

**Mainsail** (both options moderate girth—329 sq. ft.) Option 1: Fabric 7.62-oz. Dacron with four standard battens, two reefs, shape stripe, slides, headboard, and bag. Price: \$3,122. Option 2: Fabric D4 Vectran 10 with standard film/taffeta, including four standard battens, two reefs, numbers, headboard, sail slides, cunningham, and bag. Price: \$4,210.

**Headsail:** QuickSilver II (150%—497 sq. ft.). Fabric is 6-oz. Mylar, and sail includes UV cover and bag. Price: \$3,693. Rollerfurling (150%—497 sq. ft.). Fabric is D4 Vectran with standard film/taffeta, sail includes spreader patch, UV cover, and bag. Price: \$4,779.

## **UK SAILMAKERS**

For a mainsail, Adam Loory recommends “a full-batten sail made of Dacron. The full battens add durability by preventing flogging, and they reduce noise during hoisting, dousing, and reefing.” He also cautioned that full-length battens are a little difficult to race with because they lock in one shape that most adjustments can’t vary. “It is also more difficult to tell when a full-batten main is luffing.”

Determining the size of the genoa, says Loory, is contingent on where the boat will spend the majority of its sailing time. “In traditionally light-air areas like Long Island Sound and the Chesapeake Bay, you want the biggest sail possible without taking a rating penalty (155% of LP is best). If the boat sails mostly in Buzzard’s Bay or San Francisco Bay, a smaller sail would be appropriate (125-135% percent of LP).”

Regardless of its size, Loory based his quote on a roller-furling sail (in this case 140% LP) and offered quotes for both a Spectra laminate and a Pentex laminate, each reinforced with the patented Tape-Drive construction system. “The biggest difference the customer will notice is that the Spectra laminate is white, while the Pentex laminate will have a gray-green color because of the UV protection in the laminate. The Spectra Tape-Drive sail will last up to eight years with proper care, while the Pentex laminate sail will last half that time.”

Loory said he wouldn’t consider quoting on a Dacron headsail, because the boat would at least occasionally be raced.

Loory also said that due to the stated purpose of the boat, the inventory really needs an additional sail, one he says that is often overlooked. “Any boat going offshore needs a working jib to use in heavy weather. A rollerfurling genoa can handle most sailing conditions and points of sail during coastal sail-

ing, but if you're offshore and need to go to windward for long distances in a breeze, a rolled-up genoa is not going to cut it. The aerodynamic shape of a rolled up sail is too inefficient. Coastal sailors can deal with the inefficiency since a quiet harbor is usually no more than a few hours away—an extra hour bashing to windward because of poor sailshape is inconvenient, but survivable. If you're well offshore with the wrong jib, it can lead to life-threatening circumstances.”

**Mainsail** (7.0-oz Dacron, full battens, two reefs, number, draft stripes, sail bag). Price: \$3,061.

**Headsail:** Option 1—Tape-Drive Spectra Passagemaker II Genoa, including foam Luff, UV leech and foot covers, reefing reinforcements, racing numbers, draft stripes, and sail bag. Price: \$4,895. Option 2— Tape-Drive Pentex Passagemaker II Genoa, including foam Luff, UV leech and foot covers, reefing reinforcements, racing numbers, draft stripes, and sail bag. Price: \$4,420.

**Working Jib:** 8.3-oz. High Modulus Dacron jib with 95% LP, includes UV leech and foot covers, draft stripes, and sail bag. Price: \$2,841.

## QUANTUM SAILS

Dave Flynn offered two possible constructions for mainsail and headsail—woven polyester or polyester composite using oriented construction. “Your ultimate choice would be based on the emphasis of sailshape versus budget. I would probably steer you toward a woven polyester mainsail, but a polyester composite headsail,” he explained. “I would also recommend that you think hard about making the headsail smaller than a 150%, particularly if this is to be the all-purpose roller-furling sail for offshore use.” (The quote below is nonetheless based on a 150-percent LP headsail.)

Flynn also mentioned that Quantum's website allows you to look at pricing, and “play around with different-size sails, different materials, batten configurations, numbers of reefs, etc. Education on the critical issues —like whether you should use woven or composite construction—is also available online.”

**Mainsail:** Option 1—(317.28 sq. ft.) 7.62-oz. Challenge HA woven polyester, including luff and foot hardware, poltruded fiberglass battens, leech cord with cleat, telltales, sail ties, and sail bag. Base Sail Cost: \$2,203. Options: Reefs (2); \$132; Tapered battens; \$47. Total Mainsail cost: Price: \$2,382. Option 2—(317 sq. ft.) Tri-radial construction with Dimension's CX7T, including hand-sewn luff and foot hardware, poltruded battens, leech cord with cleat, telltales, sail ties, and sail bag. Base Sail Cost: \$2,748. Options: Reefs (2); \$164; Tapered battens; \$47. Price: \$2,960.

**Headsail:** Option 1—RF genoa (450.64 sq. ft.). using 6.62-oz. Challenge HA woven polyester, including luff attachment hardware, leech cord with cleat, telltales, and sail bag. Base Sail Cost: \$1,786. Options: UV acrylic cover; \$377. Foam luff; \$197. Price: \$2,360. Option 2—RF genoa (450.64 sq. ft.). Tri-radial construction using Dimension's CX6T, including luff attachment hardware, leech cord and cleat, telltales, and sail bag. Base Sail Cost: \$2,866. Options: UV acrylic cover; \$377. Foam luff; \$197. Price: \$3,439.

## CONCLUSIONS

New sails are a huge expense, but they're also a big part of the game—unless you're basically using your boat as a motorsailer (which we see more and more often on days with good breezes). You don't have to be a racer to care strongly about the shape and set of your sails.

The key to satisfaction is customer service, as all the sailmakers acknowledged. But there's a disconnect here, we think, as far as cruising sailors are concerned. While big-boat racers have long been used to taking their sailmaker for a ride with a new sail (sometimes several rides, until it's made right), cruising sailors, maybe because they're ordering sails from afar, or buying “stock,” or simply don't know when a sail is cut right or not, just don't expect that kind of treatment. But they should.

We met a cruising man this summer who was worried about where to put leads for his new working jib, but didn't want to “bother” his sailmaker. This is silly—sailmakers expect you to bother them. It's their lot in life. In our view, it's more important for a sailmaker to be willing to work with you and make sure your sails are a good fit, and re-cut them if necessary, than to make them for a low price.

Customer service varies from loft to loft, not only among small outfits, but among the big sailmaker groups, and from boat style to boat style. The owner of a Cal 2-29 said in our sail survey, “I have found small, independent sailmakers to be a little less high-tech, but very capable and customer focused.” We don't disagree, but we also know that local representatives of the big chains are sometimes more expert and efficient at making certain sails for certain boats. So there are two questions to ask of any prospective sailmaker: 1. Have you made sails for my kind of boat before? 2. Will you go out with me?

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## More Sail Lofts

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While we concentrate above on some of the biggest lofts, the ones below are hands-on, customer-service oriented operations with vast amounts of experience. We just can't cover the whole waterfront.

**Ullman Sails** — With 10 lofts in the US, part of 19 worldwide facilities, Ullman probably deserves to be included among the seven companies profiled in greater detail here, but the company's bread and butter remains racing sails, principally one-design. Ullman does make Coastal Cruising Sails and Bluewater Cruising Sales; [www.ullmansails.com](http://www.ullmansails.com)

**Banks Sails** — Another company large enough to rate coverage with the big lofts above. Banks produces three lines of cruising sails from crosscut to laminated, backed by 13 lofts in the U.S.; [www.bankssails.com](http://www.bankssails.com)

**AirForce Sails** — Specializing in inexpensive yet durable sails online; [www.airforcesails.com](http://www.airforcesails.com)

**Bacon & Associates** — Annapolis, Md.-based broker of new and used sails; [www.baconsails.com](http://www.baconsails.com)

**Bremen Sails** — Master sailmakers in Miami since 1962; custom canvaswork, covers, dodgers; 305/635-1717

**Cruising Direct** — Subsidiary to North Sails with similar product line at discounted prices; [www.cruisingdirect.com](http://www.cruisingdirect.com)

**Eastern Sails** — Custom, crosscut sails in Massachusetts for 30 years; [www.easternsails.com](http://www.easternsails.com)

**Elliott Pattison** — Custom cruising sails from a performance sailmaker in Newport Beach, CA; [www.epsails.com](http://www.epsails.com)

**Fairclough Sailmakers** — Connecticut-based firm with 50-plus years of experience specializing in crosscut cruising sails; [www.fairclough.com](http://www.fairclough.com)

**Haarstick Sailmakers** — crosscut and laminated cruising sails from three lofts in the northeast; [www.harsticksailmakers.com](http://www.harsticksailmakers.com)

**Hathaway Reiser and Raymond** — over 100 years in business, makes triradial or crosscut sails out of Connecticut; [www.hathaways.com](http://www.hathaways.com)

**Hong Kong Sailmakers** — discount online sailmaker; [www.hksailmakers.com](http://www.hksailmakers.com)

**Jasper and Bailey Sails** — traditional and cruising sails, based in Newport, R.I.; [www.jasperandbailey.com](http://www.jasperandbailey.com)

**Kappa Sails** — custom sails from a one-loft sailmaker; [www.kappasails.com](http://www.kappasails.com).

**Pineapple Sails** — long-time San Francisco Bay Area sailmaker; [www.pineapplesails.com](http://www.pineapplesails.com)

**Point Sails** — San Diego-based sailmaker with racing background; [www.pointsails.com](http://www.pointsails.com)

**Sabre Sails** — high-tech sailmaker with production based in Ft. Walton Beach, FL and 13 agents nationwide; [www.sabresails.com](http://www.sabresails.com)

**Sails East** — Hong Kong-based loft with seven U.S. agents selling basic crosscut or triradial sails. [www.sailseast.com](http://www.sailseast.com)

**Sobstad** — crosscut cruising sails with 12 North American bases; [www.sobstad.com](http://www.sobstad.com)

**The Sail Warehouse** — discount sails new and used; [www.the-sailwarehouse.com](http://www.the-sailwarehouse.com)

**Shore Sails** — durable cruising sails from a performance sailmaker, three lofts in New England; [www.shoresails.com](http://www.shoresails.com)

**Schurr Sails** — crosscut and laminated sails, based in Pensacola, FL with agents in nine other U.S. locations; [www.schurrsails.com](http://www.schurrsails.com)

**Sperry Sails** — traditional expertise with technological advances in Buzzards Bay, MA; [www.sperrysails.com](http://www.sperrysails.com)

**Yager Sails** — custom offshore and cruising sails out of Veradale, WA; [www.yagersails.com](http://www.yagersails.com) ▲

# Chapter 3

## Survey Says

### *Discount Sail Options • Reader Survey Results & Recommended Sailmakers*

The joys of enhanced performance and greater reliability take some of the sting out of writing a big check to your sailmaker, but there's no getting around the fact that sail buying is one of the biggest investments a boat owner will make. So the temptation to save a few bucks is strong, and we can certainly relate.

Because our empathy runs deep, we thought it would be instructive to assess the bargains available through online discount sail brokers—those that sell new sails and those that offer used ones as well. So, we logged on and set out to compare product options, services, prices, and warranties for a suit of working sails.

In an attempt to standardize the information we hoped to receive from these entities, we chose an established design—the Catalina 320—as our hypothetical boat. The 32-foot Catalina has the following rig dimensions: I = 43' 7", J = 12' 4", P = 38', E = 13' 3", giving it a mainsail of 252 sq. ft. and a foretriangle that measures 521 sq. ft. Over 1,000 Catalina 320s have been built since the boat's introduction in 1993, so we felt this boat would offer a relatively stable basis for comparing the sailmakers' quotes.

We chose to specify a single-reefed, fully battened mainsail built from 7-oz. cloth, and a 140-percent genoa with a UV suncover and foam luff. We didn't include any gennakers or spinnakers in our hypothetical inventory.

It's important that we also address the areas of customer service and warranties provided by these brokers and sailmakers. We believe that the people who sell sails should do more than offer lip service about standing behind their products. Even though the sails they're selling are discounted, these folks should nonetheless answer e-mails and return phone calls, and offer advice when requested regarding the many details involved in getting a sail right for the clients who are forking over their hard-earned cash.

#### **THE PLAYERS**

Based in Ft. Myers, Fla., **National Sail Supply** deals in new and used sails. It was the first discount online sail supplier we contacted and frankly, we were impressed with their response time and attention to detail. The firm's website offers a generic form to complete for quotes, as well as a direct e-mail address and phone and fax numbers that are easy to find.

Our morning inquiry was met with a quote that same afternoon by Dirk Sharland. He quoted on a new, 7.3-oz. Dacron, fully battened mainsail with one reef and internal mast slides

on the luff and a boltrope on the foot for \$1,280, including the battens. Despite our attempts to submit precise and detailed measurements and option preferences, Sharland picked up on an omission we made—sail slide size. He wanted to know whether we needed 3/4" or 7/8" slides.

A new 140-percent genoa made from 6-oz. Dacron and fashioned to fit a Schaefer roller furling system, including a foam luff and Sunbrella UV protection on the leech and foot, came in at \$1,325. Again, Sharland's e-mail response asked us for more details. In this case, he wanted to know the maximum allowable luff length on the furler as installed. He said both sails would come with a two-year warranty covering material quality and workmanship, and that the price included clam cleats, tell tales, and flow stripes. The construction included triple-stitched seams as well as large corner and reef reinforcements with a handsewn leather finish. We were glad to find pictures on the website that illustrate many of these details.

Sharland told us that the standard delivery time is three-to-four weeks from confirmation of the order, and they will ship anywhere in the world. The price was somewhere between \$25 to \$35, for one sail, shipped UPS Ground from Florida to California. Sales tax does not apply out of state, which is an added bonus. The website also specified how much the extras or upgrades would be, at a glance. An extra reef point, for instance, was \$75, and a mainsail cover was another \$171.

The total price for our test inventory was \$2,605. We should note that National Sail Supply places a particular focus on serving Catalina owners, which made this quote easy for that company, but the timely service and insight were well above average.

**Cruising Direct**, a subsidiary of North Sails based in Portsmouth, R.I., deals only in new sails. The company's website is full of good information, particularly for the DIY owner.

Dan Calore, a sales rep, offered a relatively prompt response, answering one day after our initial e-mail inquiry. He told us his quote would be for a mainsail with only two full battens (the remaining two would be partials), adding "that's the most we can do for full battens." Admittedly, that might disappoint an owner who has his or her sights set on a full-battened main.

This website offered the most extensive technical details in a downloadable, PDF format, which included an outline of the recommended sail cloth—North's NorDac 4800 (a cloth the manufacturer claims offers a greater stability than any other in the 5- to 9.5-oz. range). Standard features for mainsails ordered from Cruising Direct include cross-cut panel construction, two



*Discount sailmaker Atlantic Sail Traders outfitted this Sarasota, Fla.-based Cape Dory 25. The boat's owner reports that the sailmaker offers good-quality sails at a great price, along with top-shelf customer service.*

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rows of three-step stitching on horizontal seams, stainless-steel rings, solid fiberglass battens with Velcro closure pockets, triangular patch reinforcements, adjustable leech and foot lines, and a sail bag. Extras that are available include reefs, a cunningham adjustment, sail numbers and/or insignias, one or two full-length top battens, and a performance-enhancing roach.

There's no formal warranty, "but we stand behind our products," wrote Calore. The online order form breaks down prices for extras like reef points and cloth weight. A 7-ounce Dacron main was priced at \$1,297, one reef was \$104 and two full length battens were \$150, bringing our total to \$1,551.

The standard genoa package includes cross-cut panel construction, telltales, hydraulically pressed stainless steel rings, adjustable pre-stretched leech lines, a drawstring sail bag, and self adhesive spreader patches. For the genoa, we chose a 140-percent sail built from 8-oz. Dacron, priced at \$1,429. The UV foot and leech cover (out of Sunbrella), which added \$264 to the cost, and the reefing pad with reefing patches added another \$357, bringing our total to \$2,050. The price for the set came in at \$3,601. Depending upon your location, sales tax may apply, as does a \$40 shipping cost per sail, which bumped the Cruising Direct package up to \$3,681. Calore told us that delivery times vary seasonally, but the company recommends allowing more time for orders placed from January through June.

**Far East Sails** sells new cruising sails manufactured by a leading Hong Kong sailmaker, A. Lam Sails Hong Kong, the original sail purveyor for Cheoy Lee Yachts. The form we filled out and submitted via the website was answered five days later by Brad Gunther.

A fully battened mainsail cut from 7.4-oz. Contender Sailcloth which the manufacturer rates as "offshore quality," with one reef, was \$1,176, while a 140-percent headsail built from the same cloth and fitted with a foam luff and Sunbrella UV cover, was \$1,551. The prices, said Gunther, included air delivery, shipping insurance, and U.S. Customs Tax.

Seams on sails over 200 sq. ft. are triple-stitched and come with a leech line and clam cleats, except for the company's high clew headsails and storm sails. Main and mizzen tacks and headsail clews come with leather chafing protection and anodized aluminum headboards. Slides and hanks are coated with a soft film to protect against chafing while the sails have pressed alloy stainless steel cringles and nickel-plated slide and hank eyelets. Sails have a webbed "O" ring at the tack and clew patches with double tape along the leech and foot with oversize patches at the tack and clew. Full-battened mainsails do not come with battens or batten tensioners, an item that's left to the purchaser to install. Due to these details, we felt that photos on the website would be a welcome addition.

The lead time for delivery is approximately five weeks from receiving the order, and shipping requires two to four days via



UPS. All sails come with a one-year limited warranty. One nice touch is that before production begins, the company sends each customer a computer-generated drawing of the sail as a final opportunity to check all the dimensions prior to approving the order. The total price for our inventory was \$2,727.

**The Sail Warehouse** of Monterey, Calif., encourages sailors in the market for new and used sails to explore the website carefully to see if their questions have already been answered before making a call. Information on the site specifically states that the company doesn't offer sail quotes by e-mail and cautions against calling if searching for a used sail.

Our first call for a quote met with few results. While we had the measurements, it must have been a busy time at the loft as we were instructed to search the site by square foot for an approximate quote. We called weeks later and our luck changed, that call yielded a quote that was put together in about five minutes while we waited on the phone. And, we were told that the Sail Warehouse was going to begin stocking sails for the Catalina 320 in its inventory.

The mainsail this company builds comes in three versions, a standard OEM, the Coastal Cruise, and an Offshore version, ranging from \$1,235 to \$1,475. When we mentioned that we were looking for a fully battened main, this tipped the scale to the \$1,475 price. (We were also warned that the price would likely be going up by 7% soon due to price increases by their cloth supplier.) The Coastal Cruise version has reinforced corners and is intended for coastal and medium-duty cruising and club racing. The sails are made from performance-grade Dacron with two-to-three rows of zig-zag stitching used throughout. Pressed corner rings are reinforced with webbing and draft stripes are standard. We were told that a 140-percent headsail would run

between \$1,400 and \$1,700, but a final price couldn't be nailed down as we didn't have the precise measurement of the furler hoist, and thus we were referred back to the website, which has hundreds if not thousands of sails listed. In hindsight, we felt such a small increment—typically inches—wouldn't significantly alter a price estimate for the headsail, and we expected a more accurate quote. The Sail Warehouse offers a two-year warranty, and delivery of a sail typically takes three to four weeks. We were told that the total price for our order would run between \$2,875 and \$3,175.

**Atlantic Sail Traders** in Sarasota, Fla., is one of the biggest names in discount sailmaking, and deals with new and used sails. Bud and Betty Fahrer, who along with their son Steve, are the proprietors. AST deals with a broad range of customers owing to the fact that the company is also a full-service loft making cruising and racing sails. A full 50% of AST's business is used sails, but unlike many lofts this size, there is a full-time sail designer on staff. Betty Fahrer allows that some of the company's sails are built in Hong Kong through a long-standing arrangement with a large sailmaker there, but the majority are built on site at the company's facility in Sarasota, Fla.

Betty offered us quotes on both used sails and new ones. She first proffered a used Sobstad mainsail that closely matched our requirements, though it was a little short on the foot and slightly long on the luff. It had a rope luff and was rated as "Good" by AST, meaning that it was judged to have 70% or 80% of its life left.

Made of 6-oz. cloth, the sail had three reefs, but only partial battens. Betty told us that they could make alterations for an additional \$75 so the sail would fit our sail plan. "We do this type of alteration all the time," she said. Without alterations, that sail was \$485.

Before quoting on a used headsail, she cautioned us about the need to get precise pin-to-pin measurements for the luff length, and be sure of the correct luff tape size of our headfoil. She also instructed us on how to do that, and offered to send luff tape samples so there'd be no mistake. Then, she suggested a "Good+" UK Tape Drive headsail with UV cover, spreader patches, leech and foot lines, and reinforced corners for \$770, but cautioned us that this sail was more suitable for club racers than cruisers because it shouldn't be kept on the furler for more than a few days at a time. She also mentioned that the company's inventory changes rapidly because they also buy sails, so clients are encouraged to check back frequently if the right sails aren't immediately available.

A more suitable option for our requirements would be one of AST's new sails. Those all come with triple stitching, radial corner reinforcements, leather chafe guards, leech lines, draft stripes, telltales, and a sail bag. "All of our sails are computer designed to insure good shape and performance," said Betty. "We only use top-of-the-line Contender Super Cruise Dacron. It has a UV inhibitor to make it last longer and has a great history of holding up well over a long period of time." All sails come with a 30-day, no-questions-asked inspection period and a two-year warranty.

Betty quoted a new mainsail out of 7.4 oz. cloth for \$1,368,

with a fair sized roach (\$1,284 without the roach). The new headsail would be \$1,403, and delivery would take four weeks.

These prices are very competitive relative to those offered by the other discount sailmakers we evaluated, and AST's clear interest in customer satisfaction can't be overstated. We're pleased to recommend Atlantic Sail Traders.

**Minney's Yacht Surplus** in Newport Harbor, Calif., also deals in used sails. The company's website offers a veritable online swap meet, and with a little looking, you might find a good buy. The site's layout is a bit dizzying due to the abundance of offerings, but our e-mail quickly drew a response from Ernie Minney, instructing us to look at bin No. 45. That search yielded a 9-oz. mainsail built originally for a J/30. The sail was listed as "in excellent condition" for \$695.

Minney, a circumnavigator and experienced ocean racer, has been selling used sails for the past 30 years. He told us that each sail is re-measured before it leaves and can be returned by the buyer for a full refund for any reason. Considering the many details involved in getting used sails to fit your boat, like mainsail slide size and headsail foil size, the odds of finding exactly what you are looking for in a used sail are certainly stacked against you. But if you're looking to find something that, given a little time and effort, might work, it's worth perusing this website.

Getting in touch with the folks at **Sail Exchange** in Newport Beach, Calif., initially proved difficult. Two e-mails we sent went into the void, but we did get a return call from Scott Sheller, the proprietor, after we left a phone message. He's been in this business for 35 years and proved to be quite helpful as well as very patient once we connected with him.

Sheller said his company services every type of sailor from family cruisers to offshore racers. At the time of our conversation, he had over 1,800 sails in stock. His website segments these into mainsails, headsails, and spinnakers, and further lists them by luff length, so finding the right product is pretty simple. He said once a purchase is confirmed, the sails are shipped within two working days and the correct size is guaranteed. The customer pays the shipping charges (90 percent of the sails get shipped via UPS), and has up to 10 days to try them out and then return them for a full refund or exchange them if for some reason he or she is dissatisfied.

When buying used sails, said Sheller, the actual luff, leech, and foot measurements prove more important than I, J, P, and E measurements that might be listed on a design drawing, because the latter are boat-specific rather than sail-specific. It's also worth noting that what you see listed on Sheller's website doesn't represent the Sail Exchange's entire inventory as sails are bought and sold on a daily basis, so making a phone call is worth the effort.

While the company stocks new sails for Catalina 22s and 27s, it was sold out in the luff and foot size needed for our hypothetical genoa. Sheller did have a used mainsail in stock that closely fit the dimensions of the Catalina 320. As he does with all his sails, he had given this mainsail a rating, in this case a 6 for "good." He said that it still had two thirds of its life

left, or 8 to 9 years of use by his estimates. The sail was built by Danish sailmaker Elvström Sails of triple-stitched, 8-oz. Dacron and came with two reef points, with a bolt rope for the foot, a cunningham, a leech cord adjustment, and internal luff slides. The price was impressive—a \$495—and tempting, particularly since Sheller told us later that he also entertains “reasonable offers.”

**Bacon & Associates** of Annapolis, MD, has one of the easiest to peruse and most comprehensive online inventories of used sails that we examined. The company claims to have 10,000 sails in stock, and we don’t doubt it. The inventory is updated daily, and there are literally thousands of headsails, mainsails, storm sails, gennakers, and spinnakers listed, not only by the luff, leech, and foot measurement, but also by boat type, including some relatively obscure ones that we’ve owned and sailed. Headsails were listed in percentages of the foretriangle, along with a helpful blend of I, J, P, and E measurements for boat type.

For the Catalina 320, we found 11 possible mainsail matches (all were for J/30s) ranging from a 7.5-ounce Dacron Doyle main in “excellent condition” to a “soiled, stained, and patched” 6.5-oz. main for \$250. A search for genoas yielded some 55 results sorted by luff and foot length.

One possibility looked quite promising—a 136% Neil Pryde roller-furling headsail made from 7.5-oz. cloth, which was listed in “new condition.” It came with 3/16” luff tape, leech and foot lines, a Sunbrella cover on the port side of the sail, telltale windows, sewn-on draft stripes, and was only lightly stained, all of that in a turquoise bag. It listed for \$1,135. The company maintains a policy of offering customers a 10-day examination period that includes hoisting, but not sailing. A full refund is made if the sail, when re-examined, is in the same condition as when purchased, with all shipping costs paid by the customer. And if you have old sails you no longer use, the company buys sails, but charges a 35% brokerage fee.

**AirForce Sails**, the sailmaking arm of SailNet out of Charleston, S.C., is a relative newcomer to the industry, having been established in 2001, but the company has slowly built a good reputation with its small market share. Most sails sold here are built by a subcontractor in China, but the quality is first-rate, particularly the hand work. Because more than 90 percent of this company’s business is transacted online, we weren’t surprised to get a quote for a Catalina 320 mainsail in about 30 seconds after logging on to the site.

Mainsail options include Coastal sails (three-year warranty) with either radial or crosscut configurations, and Blue Water sails (which are more robustly built and carry a five-year warranty) with the same choice of panel configuration.

We opted for a crosscut Coastal main, which would be built from 7.3-oz., high-modulus Dacron for \$1,240, with an additional 10% discount. This sail would include an anodized aluminum headboard, two rows of stitching (for sails with luffs up to 35 feet, three rows for those over 35 feet), a webbed “O” ring at the tack, a pressed stainless ring at leech, and tapered epoxy battens.

Then we clicked on the button that read “Customize this

sail by selecting your own options.” By adding one reef and four full-length battens, the price jumped up to \$1,642 (\$1,478 with the 10% discount).

We also selected a Coastal headsail, in this case a 140% crosscut sail built from the same 7.3-oz. Dacron used in the mainsail. The basic sail includes trim lines, pressed stainless rings in the head and tack, and double stitch on luffs up to 35 feet. This would run us \$1,329, but again the 10% discount lessened that to \$1,253. Then we factored in the options, in this case a Sunbrella suncover for the leech and foot, and a foam luff, and that shot the price up to \$1,731, (\$1,558 with the discount). The total price for this AirForce inventory would be \$3,036, with a five week delivery time.

## CONCLUSIONS

With just a modest amount of talent using a tape measure, you might be able to procure new or used sails for your boat at a substantial discount, but there are drawbacks to all of this. Essentially, you’ll lack the advantage of having a sailmaker’s trained eye assess your boat (as well as the rest of your inventory). And consider that almost every source we spoke with told us that getting the measurements right is critical, even for well-established boat designs. If you end up spending \$80 to \$100 for shipping the sail from the broker and back because it doesn’t fit, there goes a big chunk of the money you might have saved with the purchase in the first place.

For a brand new suit of working sails, our research produced six firms that could deliver exactly what we were looking for: National Sail Supply for \$2,605, Far East Sails at \$2,727, Atlantic Sail Traders for \$2,771, The Sail Warehouse for somewhere between \$2,875 and \$3,175, AirForce Sails for \$3,036, and Cruising Direct for \$3,681. National Sail Supply offered the best price and by far the most attentive response to our inquiry, and thus gets the nod among new sail options.

But our budget favored the used-sail options, and among those, the Sail Exchange and Atlantic Sail Traders were our most positive experiences. We think the Elvstrom mainsail that Sail Exchange quoted at a mere \$495 (or less if our bargaining skills proved worthy), would be the best buy.

For a used headsail, we liked the comprehensive offerings at Bacon & Associates, and \$1,135 for a 140% genoa wasn’t too far out of line compared with the price quotes for new headsails that we got from the other brokers. (This one was listed as “in new condition.”)

If you’re willing to spend more, and you want the assurance of aftermarket warranty work, we’d recommend either Cruising Direct or AirForce Sails. The first has a parent company with an extensive network of lofts, which means that a service facility won’t be far away. The second has the longest warranty—three years—of any firm we evaluated.

Whether you’re buying new or used sails, there’s an opportunity to learn a lot about sails in general and your boat in particular, just by doing some web surfing on these sites. You can probably learn a great deal more by actually speaking to the people behind the scenes, if you can reach them. It’s an education that could enable you to get a better deal when the time comes.

## Reader Sailmakers Survey Results

Not every sailor has a selection of local sailmakers to choose from. He or she must instead rely on Internet research and phone conversations to find the best sail for the best price. As most of the world's sail production takes place in a handful of high-volume production lofts abroad (China, Sri Lanka, and Africa), U.S. sailmakers have taken on the role of sail designers—rather than sailmakers.

In our recent study of mainsails, we found that sails made abroad make excellent value, thanks in large part to computer-aided design and panel-cutting. Nevertheless, the sailor needs to be specific regarding the measurements and the details of construction, and his relationship with the sail designer/salesman is as important as ever—particularly in the event that something goes wrong.

Locally built or finished sails tend to be more expensive, but the advantage of having a sailmaker check your measurements on board and then make sure the sail fits and performs as designed is often worth the extra money. This kind of attention is also possible with offshore-built sails from major lofts, so long as the sales rep regards this as part of his job.

As with any major purchase, there's a good deal of reassurance in knowing that the person selling you the sail is the one that will be making it and is willing to join you for a sea trial to answer questions or address problems should they arise.

We recently polled *Practical Sailor* readers about their experiences with sailmakers. The informal online sailmaker poll generated 336 complete responses, not large enough to be statistically significant, but still useful, in our opinion. In total, readers recommended more than 100 different lofts. The responses are subjective to each respondent's experience, making it impossible to fairly rank sailmakers based on the poll, so readers should consider this report an overview and use it accordingly in any sailmaker search. The responses can offer some insight into what can be expected of a specific sailmaker and what should be considered in the selection process.

Sixty percent of the respondents said they used their boat for cruising, while 31 percent used their boat for racing as well as cruising. Just over 6 percent identified themselves purely as racers. Most (63 percent) identified their sail material as premium Dacron.

The good news was that 70 percent of our readers rated their sailmaker's service Excellent, and 22 percent rated the sailmaker's service as Good. Close to 90 percent of the respondents had purchased sails in the previous five years.

What follows are general findings regarding the most frequently recommended sailmakers in the poll. More detailed survey results are available at the website, [www.questionpro.com](http://www.questionpro.com). A complete listing of all the sailmakers recommended in this poll will accompany the web version of this article at

[www.practical-sailor.com](http://www.practical-sailor.com). We will also be publishing select comments from the survey on the *Inside Practical Sailor* blog, which is accessible through the top menu of our website.

**North Sails ([www.northsails.com](http://www.northsails.com))** – Of the major “franchise” sailmakers, North Sails was the most popular brand, with 42 respondents saying their sails were built by North affiliates. The lofts were from all over the country. The highest number of respondents (six), said they bought their sails in Annapolis, Md. Nearly one-quarter (10) reported a problem. In the ratings for overall service, the votes were as follows: Excellent, 19; Good, 14; Fair, 3; Poor, 6. Of the major national franchise sailmakers in our survey, North had the lowest percentage of customers satisfied with overall service. The chief complaint was generally the lack of personalized attention and poor after-sale service.

**Doyle ([www.doylesails.com](http://www.doylesails.com))** – Twenty-four respondents said they had their sails made at Doyle affiliates, almost all of them at East Coast lofts. Only one respondent reported a significant problem with his sail, which he said was quickly rectified with a personalized visit from the sailmaker. In the ratings for overall service, the votes were as follows: Excellent, 20; Good, 4. Respondents generally praised the lofts' after-sales service.

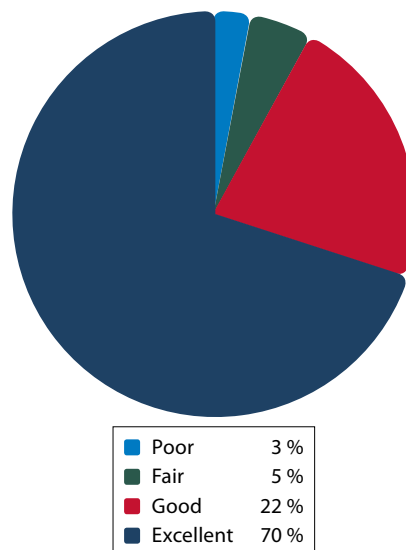
**Quantum ([www.quantumsails.com](http://www.quantumsails.com))** – Twenty-three respondents said they had their sails made at Quantum lofts. The locations were primarily on the East Coast, with lofts in Rhode Island (four), Annapolis (four), and Seabrook, Texas (three), making up the greatest number of respondents. In the ratings for overall service, the votes were as follows: Excellent, 13; Good, 7; Fair, 2; Poor, 1. Most respondents praised the level of service, although three respondents (two from Texas) stated they were not happy with details such as corner reinforcement in the clew area.

**UK Halsey ([www.ukhalsey.com](http://www.ukhalsey.com))** – Fourteen respondents said they used lofts affiliated with UK Halsey, the highest number (four) were served by the loft in City Island, N.Y. In the ratings for overall service, the votes were as follows: Excellent, 6; Good, 5; Fair, 2; Poor, 1. Criticism centered on after-sales service, which was praised by the majority of the respondents.

**Ullman ([www.ullmansails.com](http://www.ullmansails.com))** – Fifteen respondents said they used lofts affiliated with Ullman Sails, with the vast majority (11) coming from Deltaville, Va. Four of the respondents owned Flying Scots. The Deltaville loft was unanimously praised, other lofts rated excellent to fair for overall service. In the ratings for overall service, the votes were as follows: Excellent, 12; Good, 2; Fair, 1.

**Island Planet Sails ([www.islandplanetsails.com](http://www.islandplanetsails.com))** – Eigh-

Service Satisfaction





*Port Townsend Sails in Port Townsend, Wash., specializes in hand-stitched tacks (left), clews (middle), and luff eyes (right).*

teen respondents, most from the West Coast, recommended Island Planet, an Internet-phone based operations that claims to cut costs by reducing overhead. The company website stresses the importance of the owners' knowledge and involvement in the measuring process. In the ratings for overall service, the votes were as follows: Excellent, 11; Good, 7. Two respondents praised the sailmaker's ability to deliver sails to cruising boats in out-of-the-way places.

**Mack Sails ([www.macksails.com](http://www.macksails.com))** – Sixteen respondents, all of them in Florida, bought sails from family-owned and operated Mack Sails. Boats ranged from a custom, 48-foot aluminum cutter to a Schock 23 racing boat. In the ratings for overall service, the votes were as follows: Excellent, 13; Good, 1; Fair, 2. Respondents generally praised Mack's products and service. One owner complained that his mainsail was too small.

**Dorsal Sailmakers ([www.doorsail.com](http://www.doorsail.com))** – Seventeen respondents bought their sails from this Wisconsin-based sailmaker. In the ratings for overall service, the votes were as follows: Excellent, 15; Good, 2. Clients unanimously praised the sailmaker's personalized service.

### OTHER SAILMAKERS

Three other sailmakers in our survey were recommended by at least five respondents:

- **Hood Sailmakers ([www.hood-sails.com](http://www.hood-sails.com))** – 11 respondents: Excellent, 8; Good, 2; Poor, 1. Sails were generally praised for the durability.

- **Port Townsend Sails ([www.porttownendsails.com](http://www.porttownendsails.com))** – Six respondents: Excellent, 6. The sails were generally praised for their durability and long working life.

- **Kappa Sails ([www.kappasails.com](http://www.kappasails.com))** – 5 respondents: Excellent, 5; Good, 1. Two respondents praised the sailmaker for standing behind its work.

### READER-RECOMMENDED SAILMAKERS

Here's a list of *Practical Sailor* readers' top picks for sailmakers. Visit [www.practical-sailor.com](http://www.practical-sailor.com) to find links to these companies.

#### Global

- Doyle
- Evolution Sails
- Far East Sails
- Halsey Lidgard

- Hood Sailmakers
- Island Planet Sails
- Lee Sails
- Mauri Sails
- North Sails
- Quantum Sail Design Group
- Rolly Tasker Sails
- UK-Halsey
- Ullman Sails

#### Canada

- North Sails Toronto
- Triton Sails
- North Sails Vancouver
- ShoreLine Sails
- Voile Saint-Onge

#### South Africa

- Quantum Sails South Africa

#### U.S. National

- JSI
- North Sails Direct
- The Sail Warehouse

#### California

- Elliott / Pattison Sailmakers
- Glaser Sails
- Morrelli Performance Sails
- Santa Cruz Sails
- SLO Sail and Canvas
- Ullman Sails Long Beach
- Ullman Sails San Diego/Seattle

#### Colorado

- Kelly-Hanson Sails

#### Connecticut

- Z sails

#### Florida

- Atlantic Sail Traders
- Bremen Sails
- Emerald Sails
- Knighton Sailmakers
- Mack Sails

National Sail Supply  
North Sails Gulf Coast  
Smyth Team Sails  
Super Sailmakers (Doyle loft)  
True North Sails

### **Illinois**

Doyle Midwest  
North Sails Chicago  
Sterling Sails  
UK-Halsey Chicago

### **Indiana**

Sailrite

### **Louisiana**

West Wind Sails

### **Maine**

Bayview Sails and Rigging  
Bluffton Bay Sails  
Bohndell Sails  
E.S. Bohndell Sailmakers  
Hallett Canvas and Sails  
Maine Sailing Partners  
Nathaniel S. Wilson, Sailmaker

### **Maryland**

Ace  
Bacon Sails  
Doyle Chesapeake  
North Sails Annapolis  
North Sails Chesapeake  
Quantum Sails Annapolis  
Quantum Solomons Island  
Scott Allen Sailmakers

### **Massachusetts**

Downs Sails  
Doyle Boston  
Doyle Buzzards Bay  
Doyle Manchester  
Squeteague Sailmakers

### **Michigan**

Doyle Sails Detroit  
North Sails Detroit  
Quantum Sails Traverse City

### **Montana**

Taylor Sailmakers

### **New Jersey**

Eggers Sails, Inc  
Hendrickson Sailmakers  
Linthicum Sailmakers  
North Sails - New Jersey

### **Oklahoma**

Kerr Sailmakers

### **New York**

Bay Sails (a Haarstick Loft)  
Doyle Ploch Sailmakers  
Doyle Sailmakers Long Island  
Haarstick Sailmakers  
Quantum Sails Long Island  
Somerset Sails

### **North Carolina**

Omar Sailmakers

### **Rhode Island**

North Sails  
Intensity Sails  
Thurston Sails

### **South Carolina**

FX Sails  
North Sails South Carolina  
Waters Sails

### **Texas**

C&C Sailmakers  
Cameron Sails  
Mariner Sails  
North Sails Kemah  
Quantum Sails Gulf Coast, Seabrook  
UK-Halsey Texas

### **Vermont**

Vermont Sailing Partners

### **Virginia**

Baxter Sailmakers  
Dabbler Sails  
Hampton, VA Sales & Sail Care  
Latell Sails  
North Sails Hampton  
Ullman Sails Virginia/Latell Sailmakers

### **U.S. Virgin Islands**

Quantum Sails USVI

### **Washington**

Neil Pryde (Scott Rush, agent)  
Port Townsend Sailmakers  
Puget Sound Sails

### **Wisconsin**

Dorsal, LLC ▲

# Chapter 4

## Mainsails

### *Sensible Sail Choices • Buyers Guide • Fit & Finish*

Sailmakers around the world have been printing up new business cards even though they continue to work for the same franchised lofts. Their new cards have swapped job description titles from “sailmaker” to “sail designer,” a result that’s partly due to the proven value of computer-aided design and partly due to a growing trend toward sending sailmaking overseas. Like so many other industries, sailmakers have responded to the lure of lower labor rates and the growth in high-tech manufacturing skills in Asia. Many of the big-name lofts have curtailed much of their domestic sail production and instead focus on building each customer a virtual sail in their local loft, digitizing carefully made measurements, and electronically forwarding the data to a mega loft on the other side of the globe.

Sailmaking success continues to be measured in units of satisfied customers, and despite the remote location of the loft floor, this globalized approach seems to present a viable model, both from the perspective of the consumer and the business. It’s true that not as much dialogue can take place between the loft salesman, sailmaker, and skipper—a kind of collaboration that in the past led to some important decision making and genuine brand allegiance. But a capable sail designer can still deliver the goods. To do so, he must address three critical points: capture accurate initial measurements, use sophisticated design software to customize sails for the specific boat, and match the design work with the sailing preference and crew skill level.

Fortunately for those who savor the working relationship that they have had in the past with their favorite salesman/sailmaker, there are still smaller independent lofts where sewing machines continue to whirl away and where the sailmaker who built your sails is still willing to join you for a sea trial. Such lofts are like independent hardware stores—an endangered species, something we’ll all certainly miss when the full effect of centralizing sailmaking takes hold. Some of the independents will survive on the repair work that the sailing season generates, but many see the handwriting on the wall and are turning production over to wholesalers such as China Sails Factory in Guang Dong Province, Southern China.

The recent industry trend toward moving production offshore is anything but a new idea. For decades, Neil

Pryde has proven that there’s merit in Adam Smith’s business model of leveraging cost-effective manufacturing even if it separates the plant and the purchaser.

Pryde’s business plan has worked, and it has proven to be a globalization win-win for most, if not all, of the players involved. Now, with others jumping on the Asian mega-loft band wagon, one can only wonder what the long run will hold for domestic sailmakers.

Rich McGhee, president of U.S. sales for the China Sails Factory, and Skip Dieball, director of One Design, are strong advocates of the cost effectiveness of moving sailmaking offshore. One of their sailmaker clients summed it all up by saying, “We can’t even make sails for what the overseas lofts sell them for.”

Many namebrand lofts use China Sail Factory for some of their sails. Not only is the workmanship solid, but by specifying a particular sail material, the worry over substandard sailcloth can be avoided. One sailmaker we spoke with said that he always recommends picking a top of the line Dacron and opting for the blue water upgrade.

China Sail Factory is becoming the 800-pound gorilla of modern sailmaking, and it has turned into the sailmakers’ sailmaker—creating product for Hood, North, Doyle, Banks, Elvstrom and a couple of dozen other very familiar namebrand lofts. The deal is wholesale only, and local sailmakers all over the world use China Sails as their manufacturer for some or all of the product that they sell. In this way, individual lofts still interact with customers, making sure that the measurements and sail construction details are as specific as possible. In addi-



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*The Dacron material on this Hanse 400's sail will likely outlast the stitching. (Photo by Ralph Naranjo)*

tion to digitally identifying the specific shape and sailcloth to be used, the local loft can input the location of reinforcing patches, hardware, batten pockets, and their company logo. Feedback from the pros indicates that China Sails delivers on time, and the finished sail is a high-quality product.

The success of this remote manufacturing process is much like the magazine business, a process in which editorial content and design come together at one location, but the printing process takes place elsewhere. The challenge to both industries is getting a completely accurate digital file depicting the sail or the publication to the computer at the production facility. In the case of China Sails, the production team underscores that they do not measure masts or sails with customers; that's the job of the loft contracting their service, and it's that link upon which major sailmakers have built their reputations. The industry has seen it as the wave of the future, and now many other sailmakers—large and small—have silent sewing machines and growing UPS accounts.

The flip side of this argument is the need to keep a local loft supported so that the domestic sailmaking industry retains craftsmanship as well as salesmanship skills. This is more than a twinge of sentimentality. Labor market swings occur in shorter and shorter intervals, and losing a domestic trade such as sailmaking may be a short-term gain followed by a long-term disadvantage. Sail lofts may be able to keep the doors open by sending production overseas, but those who actually make sails won't have enough work to keep their profession viable. Today, every decent-sized harbor seems to have one or more resident sail lofts, and we take such sailmaking and repair availability for granted.

## STRING THEORY

Sails are a fascinating engineering statement, and when all is said and done, what's sought after is the lightest material possible that will neither stretch nor tear as it withstands the ravages of wind-induced pressure, vessel righting moment, and harassment from sunlight, chafe, atmospheric deposition, and other deteriorating effects. Thanks to modern chemistry, cotton cloth lies well astern, but for several important reasons, even after 50 years, Dacron has yet to be destined for the junk pile. The pros we interviewed for this article remained surprisingly bullish on Dacron, and it caused us to do some research into why the modest polyester fiber still has such a following.

The answer has to do with cost and chemistry, or more specifically, the crossover point where features such as tenacity, flexural endurance, UV stability and resistance to chemical deterioration stack up on a cost-per-square-yard basis. For those looking to stretch their sail-buying dollars, Dacron delivers. But the real value lies in tightly woven high-yarn-count "premium" Dacron, a material that holds its shape and will keep cruisers happy for the long haul.

Those willing to pay more to optimize performance have a wide range of just-out-of-the-lab, high-modulus material options to choose from. In addition, there are engineering differences in how high-performance sails are built. The basic premise is to lighten up the sail where the loads are the lowest, and reinforce the hot spots. Sail designers understand the value of

engineering these foil shapes to cope with the load paths that develop in a given sail. The most savvy designers recognize that a static load path diagram is just one snapshot of what's happening in the sail. Take for example the forces influencing a sail during a beat to windward in 20-knot conditions. A finite element analysis (FEA) diagram would depict the stress/strain flow through the sail, and if reinforcing yarns aligned with this energy profile, the sail would be structurally optimized for that given condition.

Unfortunately, sails need to be able to cope with a wide range of challenges, and if we complicate the above example with a wave breaking in the foot of the sail, a very different FEA load path would be depicted. The bottom line is that sails need to cope with a wide range of conditions, and this isn't solely a concern for racers. Take for example a cruising headsail on a roller furler, one of the most demanding applications of all. The sail is reefed to varied sizes, endures torsion loads, is rolled up wet and sits in the summer sun for weeks on end. At least racing sails can be designed for very specific wind ranges and sea states, where loads are more predictable and when not in use, they are neatly flaked and stowed out of the weather.

In order to achieve high strength and lower weight, high-modulus materials like Kevlar, Spectra, carbon, Vectran, North's Cuben Fiber, and other ultra-high molecular weight plastics are strung into high-end sails in much the same way that carbon fiber is used in a hull skin. What all of these yarns have in common are mechanical properties that exceed the tensile strength and resistance to stretch of traditional Dacron. These esoteric fibers are by no means the twill of the emperor's new pants. They are test-tube innovations that double, triple, or even quadruple the breaking strength of good-old Dacron. Unfortunately, all of the high-tech solutions seem to come with one or more inherent downsides. Some fibers such as Kevlar and Vectran have little tolerance for UV, while other materials—carbon fiber, for example—have a price point just shy of spun gold. The competitive racer is driven toward esoteric yarns because the boats just ahead of him have made the switch, and for those who can afford the stronger, lighter material, there is a proven performance edge.

## MORE THAN CHEMISTRY

Performance is partially based on what fibers your sails are made from, but also influenced by a second pivotal issue: how the sail material is made. At the cutting edge of the industry is sail molding and a membrane approach as exemplified by North Sails' pioneering efforts with what it calls 3DL (three-dimensional laminate). In this process, a thermal-setting adhesive film is placed on a shape-controlled male mold, and yarns are towed into position Peter-Pan-like by a sailmaker in a harness. The spiderweb of strings that he tows into place conforms to the sail designer's detailed plan for load sharing. Once strung, a vacuum bag and heat-bonding process seals the deal. The resulting seamless main body of the sail maximizes evenness of energy distribution and eliminates stress risers caused by overlapping seams. These sails are great performers, but they're a big-buck commitment probably best suited to those whose pulse remains steady when their Rolex falls overboard.



Another approach to membrane sails is found on a roll rather than on a mold. Dimension-Polyant's D-4 method involves engineering the load-path for a specific sail as they make the cloth in the factory. It's an automated process that tightly controls yarn reinforcement patterns as it builds up on the film or taffeta surface prior to being pressure and heat bonded in place. Once the bonding resin is cured, the sailmaker is sent carefully marked panels that replicate the information on the digital file sent to Dimension Polyant. Pieces fit together like a high-tech, jig-saw puzzle with the sail's reinforcement matrix carefully aligned with complex load-paths. Proponents of this approach feel that the yarn trajectories as well as the temperature and pressure control in the laminating process are more tightly controlled.



### ADVICE FROM THE PROS

To get a more complete picture of how the trend to offshore sailmaking is impacting everyday sailors, we turned to three trusted voices in the industry. We were particularly interested in what they had to say about high-tech/high-modulus materials and who needs them in their sails.

“Look for a sailmaker not a salesman,” says John Jenkins, the head of the U.S. Naval Academy’s Sail Loft. Jenkins has been in the trade for over three decades and has designed and built sails for boats ranging from one-design dinghies to 60-footers crossing oceans on a regular basis. Just as important as his engineering and sailmaking know-how is his open-minded perspective when it comes to new products and new approaches to building sails. He’s also not bound by brand spin and market share pressure, so his observations tend to be focused on the end-user rather than the bottomline. And the latter is why we lead off with his opinions.

When we asked Jenkins what sail material is best for the cruising sailor, his unequivocal response was, “You’ve got to go with Dacron.” There was no hesitation, no caveat. “High modulus materials are lighter and stronger, but they are also more fragile and have a very short lifespan. These esoteric materials have a valid role for a racer, but when it comes to cruisers, Dacron should dominate.” He went on voicing an opinion we agree with, “high-modulus-yarn-laden membrane sails are a fine product for top-tier competitors with a big budget, but they’re not cost effective for the cruiser looking for longevity, UV stability, mildew avoidance, and the ability to endure roller-furling harassment.”

Jenkins’ cruiser’s sailcloth of choice is either Dimension’s high-quality Dacron (polyester) square weave or Challenge’s Marblehead weave. The latter is a cloth comprising DuPont 52 and Honeywell IW70 yarns. Both materials are light on resin and pack lots of thread into every square inch of cloth. He also prefers woven Dacron for its mildew resistance and uses a fill-oriented weave such as CX-9 for higher aspect ratio headsails.

Quantum Sails designer and material guru Doug Stewart knows the performance value of carbon-fiber packed D-4 membrane sails, but he’s also quick to reiterate many of John Jenkins’ candid comments. He stressed the importance of discerning just how competitive a potential customer happens to be, and despite being a serious advocate for technology, he too was quick

*Locally built sails offer the advantage of having a sailmaker check your measurements on board and then make sure the sail fits and performs properly. (Photo by Frank Lanier)*

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to endorse the value of tightly woven premium Dacron as a cruiser’s top choice. He saw laminates playing more of a role in larger boats where sail weight becomes a big issue, but pointed out that mildew accumulation and delamination, though significantly reduced with new approaches to bonding, are still a concern to cruisers.

Carol Hasse, owner of Port Townsend Sails, is the quintessential cruising sailors’ advocate, and is always looking to build quality and long term reliability into the sails she makes. Her vision includes the insight that “at sea you’re a long way from your sailmaker and the extra care that goes into the initial design and construction will pay off in the long run.” This is especially true on the rough nights at sea when the reefing process starts just a little too late. From Hasse’s point of view the right choice in material is a premium woven Dacron that affords a little less on the performance side of the ledger, but a lot more on the handle-ability, durability, and longevity.

### CONCLUSION

The bottom line for the consumer is part price point and part utilitarian. The big questions are how much sail trimming are you willing to do and will you take advantage of molded membrane sails. If you’re a cruiser, you may be better off with top-quality woven Dacron that offers good sail shape and an excellent lifespan. And in the opinion of three very skilled sailmakers, your best bet is indeed a step back to the future.

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## **Buyers Guide: Choosing a New Mainsail**

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The mainsail of our Chesapeake Bay test boat was intact, but, after exhausting every life-extending option available—including patches, repairs, re-stitching, and tune ups—it became obvious that the sail was on its last legs.

As with any big-ticket item, purchasing a new main involves a number of choices, each of which are driven by an equally diverse list of factors to consider, from the type of boat



*The original mainsail left plenty of room for improvement. The external slides (above), though reliable, put a lot of friction on the luff. The stack height (left) was hard to manage. (Photos by Frank Lanier)*

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(cruiser or racer) and area sailed (inshore, coastal, or blue water) to the type of sailor you are (i.e. a performance-oriented hard charger or someone with a more laid-back approach).

To help with our mainsail replacement mission, we turned to Baxter Sailmakers Ltd., a well-respected loft located in Norfolk, Va. Owner David Baxter brought a wealth of knowledge to the project and proved to be a valuable sounding board while considering the various options available. Baxter is hardly alone in this category. Although franchise affiliates garnered the lion's share of recommendations in our recent reader poll, some of the highest encomium went to independent sailmakers like Baxter.

### **SAIL SELECTION FACTORS**

Many of the decisions we faced were easily answered based on a realistic review of our boat, future sailing plans, and a review of existing mainsail pros and cons we'd noted throughout the years. Our test boat is a 36-foot Union cutter, a full-keel, heavy-displacement cruiser reviewed in the February 2010 issue. Future sailing plans include cruising Chesapeake Bay and the East Coast, with the occasional Caribbean crossing thrown in.

Once these initial questions were answered, the actual decision-making fun began in earnest. These included decisions about sail construction (cost, cloth, weight, number of reefs, etc.) as well as possible upgrades to the flaking system, track system, reefing setup, and similar details. Here's a step-by-step account outlining the major options and selection process for our new mainsail, along with the reasoning behind each decision. While your decisions at each step may vary, the exercise can help serve as a template for your own mainsail search.

### **MATERIAL**

Our old main was constructed of Dacron, and while we may have briefly fantasized about the use of some exotic fiber or laminate,

in the end, polyester continued to offer the best balance of cost, longevity, and performance for our particular situation. We decided to go with a premium-grade polyester (Dimension 360AP-MTO 8.4 ounce) that was described by our sailmaker as bulletproof and virtually maintenance free.

Premium polyester is tightly woven and has a high yarn count that provides good shape retention and good performance over a wide range of wind speeds. Other benefits include durability, longevity, UV stability, softer "hand" (feel of the cloth), and lower cost.

As to cons, polyester cannot deliver the same weight savings or shape that you find in high-tech laminated or fiber-reinforced cloth; however, we decided that the materials benefits made up for any loss of performance. (You can only squeeze so many knots from a Union 36.) From a cruising perspective, we felt that laminated sails didn't offer the best value with regards to longevity, particularly as they are still subject to delamination and mildew issues despite a number of advances in the manufacturing process.

### **CORNERS, CLEWS, AND EYES**

A few "traditional" sailmakers feel that hand-stitched elements at the corners and clew are the best option for cruisers, on the basis that they better spread loads and are more easily serviced or repaired at sea by the owner. Others say there is nothing wrong with high-quality pressed-in eyes, as the cloth will typically fail before the hardware tears out or fails. Our existing main used a riveted aluminum headboard and pressed eyes. As both served us well over the years with no failure, we opted to use them with our new main as well. There is a difference in quality of pressed eyes, however. We used all stainless-steel eyes supplied by the Swedish sailing hardware company Rutgerson Marin.

### **BATTEN BANTER**

One of the first post-cloth decisions you'll have to make is whether your new main will utilize full-length battens. There are a number of pros and cons regarding full-length battens

and a wide range of opinions on their merits for cruising. Some cruising sailors choose to forego battens altogether, but if you want your mainsail to have a decent amount of roach, you'll need some form of batten support.

On the plus side, a full-battened mainsail holds its shape longer and is easier to stow (particularly with furling devices such as lazy jacks, etc). Battens allow more roach, which enhances sail performance, and also dampen sail flogging, which increases sail life and reduces noise during hoisting, dousing, and reefing.

On the downside, full-battened sails are more complicated to build and add considerable expense to the sail. Fully battened sails are also a bit more difficult to race with, as the sail is “locked” into one shape, reducing adjustment options. It's also more difficult to tell when a full-battened sail is out of trim. Battens can chafe the sail and the pockets that hold them, and they are prone to hanging up on standing and running rigging when the mainsail is raised, reefed, or doused. Batten pockets are a primary source of mainsail repairs. Battens put significantly higher loads on the track and cars, and they also increase the stack height of the sail luff.

Our old main had full-length battens, and in our mind, the benefits provided by a battened main outweighed the negatives. However, in light of our experience with a full-battened main, we decided to try a hybrid approach — a “2-plus-2” configuration, with two full battens at the top, and two partial battens at the bottom.

On the plus side, partial battens make the sail more adjustable with minimal loss of performance (as compared to a full-batten sail). The sail is also easier to trim when hard on the wind. Since the top two full battens are still relatively short, they don't hinder the raising or lowering of the sail.

The two partial battens still distribute the load across the sail well, but their shorter length means there is less compression at the luff. This reduced friction on the luff track makes it easier to reef. A partially battened main is easier to remove from the mast—when the need arises—than a full-battened one. It is slightly cheaper to build, and matching the length of the partial battens with the longest full-length batten reduces the number of spare battens needed. A well-made and well-cared-for, partially battened sail can deliver 10-plus years of good service.

As to downsides, a partially battened main is not as easy to stow as a full-battened one, and while the 2-plus-2 setup dampens flogging, a full-batten main does it even better. This also means the partially battened sail will lose its shape quicker.

## REEF POINTS

Once we decided on our batten style, next up was the number and position of reef rows to reduce mainsail area during heavier winds. Our existing main had three reef rows, each consisting of a secondary tack and clew cringles and intermediate reef points used to secure the bunt of the sail when reefed.

The primary decision with our new sail was the number of reef points. While the existing three rows may have provided more reefing options, we rarely (if ever) used the third reef,



*A Schaeffer battenslide with a Strong Track slide and track system are a cost-effective retrofit to help reduce friction. A platform pocket provides protective layer of material between the batten and the sail. (Photo by Frank Lanier)*

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which also complicated things by adding additional running rigging.

After discussing the pros and cons with our sailmaker, we opted for two reefs rather than three. The first reef reduces the mainsail area by 15 percent, while the second is at 29 percent. Some sailmakers might suggest an even deeper reef (say 40 percent), to allow the main to function as storm trysail.

Baxter's opinion was that trying to make the main do everything was not the best approach in our case, particularly since reefing the main to the size of a storm trysail would result in poor sail shape and less-than-ideal performance. He suggested that two reefs in conjunction with a proper storm trysail would better serve our occasional bluewater aspirations should the weather turn heavy.

Another upgrade we made was installation of “quick cringles” (aka “easy reefs”), which consisted of a length of webbing through each reef cringle with a stainless-steel ring sewn in on both sides. The rings make reefing quicker and easier than trying to fit the reef cringle over the reef hook, while also reducing sail chafe and distortion. Some cruisers have added Dacron straps at the luff and small blocks at the clew to help pull down the main for reefing, but we opted not to have these features.

## LOOSE FOOT OR FIXED

Another change from our old sail was the decision to go with a loose-footed main. Our old main had a substantial outhaul car and was also attached to the boom along its entire length, a belt-and-suspenders approach that our sailmaker deemed unnecessary. In addition to being easier to bend on and remove, a loose-footed main offers other advantages, such as easier and more efficient sail trimming. One possible downside would be the higher loads placed on the outhaul car (if not sufficiently robust).

## TAMING THE MAIN

Our old mainsail utilized a Dutchman stowage system (installed by a previous owner). We considered other flaking sys-

tems for our new main (lazy jacks, lazy jack/sail cover combos, etc.), but we've been pleased overall with Dutchman system and decided to use it with our new main as well.

One change we made was to go with the Dutchman's 40-3A system, which has three control lines, instead of the previously installed two-line model. Based on conversations with the manufacturer, the 40-3A was the correct system for our sail and would provide better control and performance. By sending in the tabs from our old Dutchman, we qualified for a 30 percent trade-in discount.

(For more on mainsail handling options, see Chapter 5.)

## SLIPPERY UPGRADES

Once the basics of our new mainsail were decided, the next step was to review possible upgrades to the system as a whole. After discussing the various options available, our sailmaker stated that the biggest "bang for the buck" upgrade we could make would be to eliminate our friction-inducing external slides by installing a Tides Marine Strong Track and Slide System. The system is a mainsail luff track and slide assembly that greatly reduces the friction normally associated with raising and lowering the mainsail. The track is a single length of low-friction, ultra-high molecular weight polyethylene plastic (UHMPE) that is machined to slide onto your existing mast track. Installation is simple, straight forward, and the results when raising and dousing our new sail are nothing short of amazing.

Another great recommendation by our sailmaker was to upgrade our batten cars to Schaefer Battslide receptacles. The Battslide units (which accept both flat and round battens) allow front-end loading and batten adjustment at the mast. Front-end loading allows you to keep the leech of the sail closed (making it impossible for a batten to slip out through the leech), while the batten-tension adjustment feature makes it easier to maintain proper sail shape.

Although Schaefer doesn't make a slide that fits the Tides Marine Strong Track system, the Tides Marine #400 slide fit the Battslide cars perfectly and provided full articulation, which makes raising and lowering the sail easier while reducing batten compression loading.

## CONCLUSION

Purchasing a new main is big deal for the average sailor, an event that most cost-conscious cruisers go through only a handful of times in their sailing life. This infrequency makes it a heady experience, one that's equal parts anticipation and trepidation as you wade through the various options and select those that will (hopefully) produce that perfect sail. As with any major project, combining your own experience with research and the advice of a professional will go a long way toward ensuring you reach mainsail nirvana. At the heart

of this experience is the relationship with the sailmaker. A good sailmaker will patiently listen to your expectations and explain the various options, and more importantly, will stand by you after the sale.

## THE FINAL TALLY

- **Sail area:** 332 square feet
- **Cloth:** Dimension Polyant sailcloth 360AP-MTO 8.4-ounce; over Bainbridge Ocean 845, 8.5-ounce, medium finish
- **Batten Receptacle:** Schaefer Battslide #401-10 Front-loading Combination; about \$70 per full batten
- **Luff Slides:** Tides Marine Strong Track and Slide System; \$27.50/ft. (includes track, slides & receptacles)
- **Flaking system:** Dutchman 40-3A; \$401 (\$699 without trade in), \$275 to install
- **Total cost:** \$5,069

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## Fit & Finish

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At first, it may seem way too obvious to mention that a sail needs to fit, but there's more in play than just the lengths of the major legs of the triangle. As far as the latter is concerned, it's much better to be a little shy of the maximum marks, rather than finding that the luff or foot is a couple of inches too long.

Even high-modulus sail cloth stretches a bit during its life span. Although racing-sail makers are always interested in not giving up any allowable sail size, a cruiser is usually better off with sails a couple of inches shy of max length on the hoist and outhaul. The same thing goes for roach size. It's a tricky part of sail that can be overdone resulting in a frustrating pas de deux with the backstay.

Fit also refers to the offsets or setbacks built into a sail to compensate for the gooseneck tack hardware and the clew attached approach. Placing these rings in inappropriate locations can place excess load on luff slides and even instigate an odd crease radiating from the tack. In order for a mainsail to set the way the designer planned, each of the three corner points needs to be where the software algorithm assumed they would be. A good sailmaker is like the proverbial carpenter who measures twice and cuts once.

Another important feature to check on every new mainsail is how each reef sets, and whether or not it aligns with the reefing hardware. Older boats tended to have much lower mainsail foot heights, especially in comparison with modern higher freeboard sailboats. Therefore, it's important to make sure that reefing the main also elevates the outboard end of the boom so that in heavy weather, the boom will not drag in the water while reaching in a rolling sea. ▲

# Chapter 5

## Handling the Mainsail

*Track Hardware • Mainsail Handling Systems • Reefing Advice from Pros*

On an old square-rigger, the majority of control lines were devoted to the three S's. The myriad lines on those vessels far exceeded the piles of “spaghetti” seen on modern race boats whose crews often appear to think that disorder is cool. It's not. It's dangerous.

Aboard big sailing ships, carefully stowed on belaying pins, there were the usual halyards and sheets for the clews and braces for the yard arms. There were lots of very sturdy pin racks at the base of the masts and pinrails along the bulwarks. In an emergency, any line could be released by simply pulling out its pin, and hoping the line didn't run foul.

Other control lines had colorful names that are now long gone from common usage. There were throat halyards, laskets (sewn-in loops of small line used to set bonnets and drablers\*), gaff peak vang, crossjack lifts, and whip tackles.

Every sail had brailing pendants, which, when the sail had to be doused in a hurry, were quickly hauled in to the mast via a single line with five or six whips, a sail's peak, clew cringles and leech. It was sort of like a crowfoot without a euphroe\*\*.

Most noteworthy among the rigging terms that have survived is “buntline.” The word escaped death by disuse only because it's a superb hitch, easy to tie, and very secure. It was used to adjust lines attached to the foot or middle (the bunt) of a square sail through buntline thimbles. Hauling on the buntlines from on deck dumped the air out of a sail, and may have saved the mast from time to time. But we digress.

On a modern sailboat, handling the mainsail quickly and surely is equally important, both as a safety measure and as a matter of convenience. Thanks to a lot of thoughtful engineering—beginning with the replacement of laminated, steam-bent, copper-riveted oak hoops (they also came with brass machine screws to dismantle and slip on an already stepped mast) or iron rings with parrels—with good mast hardware, it's less complicated, too.

Perhaps the simplest way ever devised to join a mainsail to a mast was the two-layer sleeved sail. A few sails still are sleeved, which makes a very efficient sail, but they're seen mostly on small one-design boats like the Laser.

Cruising boats with unstayed masts, like the Nonsuch (which has a fierce following) and early Freedom Yachts, flirted briefly with sleeved (or wrap-around) sails, but reefing and stowing them proved to be too difficult.

Most often seen up to three-score years ago, on either wood or aluminum masts, was the external bronze or stainless steel track on which rode metal slides lashed or shackled to the

sail. Modern versions have bits of clear plastic to protect the sail from chafe. This is still a near-perfect system, which has enough flexibility to make the sail easy to hoist, reef, or strike and stow. (The shackled-on slides are easy to replace; the newer webbed versions require some marlinespike skill.)

Still, sailhandling efficiency took a step forward when the boltrope luff and slotted mast system came into the mainstream some years later. This system presents a nice shape to the wind and eliminates the gap between sail and mast. It remains the current choice for conventional race boats, but is not much favored by club racers and cruising sailors. A boltrope sail can be difficult to hoist, a mess to lower and, in a mounting breeze, requires at least two crewmen to reef.

An attempt to overcome the boltrope sail's shortcomings arrived with nylon slugs—plastic extrusions, lashed or webbed to the sail—that fit in a circular mast groove. Like metal slides on a metal track, the slugs stay in the groove and pile up when the sail is struck or reefed. In early versions, the slugs were too weak. When one broke, the load on its neighbors quadrupled, and soon the luff went like the buttons on a fat man's vest. Today's best slides are made of UHMW (ultra high molecular weight) plastic, which is tough, hard, and slippery—ideal properties for sail slides.

As the metals industry became more and more adept at squirting liquids out of precision-made dies, the next development was an extruded aluminum mainsail track with an internal shape needed to accept plastic or metal slides. This facilitated a host of refinements. A sail being lowered tends to fold on both sides of the boom, which twists and racks the slides, and tends to bind or break them. Aluminum slides, hardened by anodizing, are excellent, but here again, the UHMW plastics are tending to prevail. There have been extensive and successful efforts to improve slides (and slugs) and some of which are depicted here in photographs.

Then battens came along to complicate the issue. You can now get battens in almost any size and most shapes.

There's also an ever-growing need for specialized kinds of track. Some hardware makers now have proprietary track for use only with their hardware. The Harken catalog, for instance, contains dozens of kinds of track, from Micro CB low-profile, to midrange track, to high or low-beam (as Harken calls it) small boat track, to mini-maxi, maxi, and stainless steel track, not all of it for masts, of course. Harken is a big track player.

Working in the other direction, which seems equally if not more sound, Antal (available in the U.S. via Euro Marine Trad-



*Tartan Yachts' carbon-fiber Stow-Boom neatly catches a fully battened sail.*

.....

ing) offers track that can be easily and securely mounted in any spar's existing round luff groove. It uses a half-round slug and a clever fastener. With this approach, there's no need to drill and tap holes in the mast, but Antal's track can only be used with the company's own hardware—low-friction plastic slides mounted inside an aluminum car.

Because a boat owner who wants a new sail-handling system often cannot afford to buy a new mast, other manufacturers have also tooled up to make other adaptor tracks in a similar fashion, like Dutchman, Facnor, and Selden.

Finally, not too many years ago, sailmakers fell upon an idea that Chinese mariners discovered so long ago that its origin isn't known—fully battened mainsails. However, unlike the Chinese, modern sailmakers have made it quite complicated and, of course, equipment-rich.

A knowledgeable observer of the retrofit market, Tim Robinson, vice-president of Euro Marine Trading, told us: "There are more and more full-battened systems. They're growing all the time. We now install up to 300 systems a year. They're expensive, no doubt, but good."

Tom Braisted, the service manager of the Hood Sails loft in Middletown, R.I., gave us an example of the cost. "We quoted a sailor with a Bristol 38.8 for a full-batten main, but the cost—around \$8,000 to \$10,000—set him thinking ... A full batten system for, say, a Tartan 30, would cost an extra 15 or 20 percent," said Braisted, comparing that to one with partial battens. "And, if you want Harken hardware, the cost of a replacement mainsail might double."

Despite the increased cost of full-battened sails, Dolph Gabeler, the service manager at North Sails, in Portsmouth, RI, is quick to cite the advantages of these mainsails. He's been a sailmaker for 30 of his 42 years and said that about 85 percent of mains from his company are now fitted with full battens.

"They're more efficient, not only by permitting more roach, but also by making it easier to reef, flake, and shape the main," he said. "Especially important to the cruising sailor, there's a lot less movement—luffing, flapping and fluttering—of the material and that drastically cuts wear."

Despite the occasionally heard view that a full-batten system is favored mostly because it makes flaking and reefing easier and is only a "faster" sail because the battens support more roach, Gabeler said: "You get more power and speed because the shape can be more precisely controlled. Once thought to be only for boats, say 40 feet or more, you're seeing full-batten mains on lots of small boats, down to about 25 feet."

"The worst [arrangement] is a full-battened main on slugs

in a slot," said Aaron Jasper, of Jasper & Bailey, a small, traditional sailmaker based in Newport, R.I.

There have been lots of bumps in the development of the modern full-battened mainsail. The forward pressure exerted by the batten on the mast has taxed some very inventive minds to come up with better slides and cars (with ball bearings, wheels, or special inserts). Because of the growing popularity of full-battened mains, the competition has been intense, and *Practical Sailor* has kept abreast of this.

We've reviewed Fredericken's expensive yet versatile Ballslide track system, Harken's much-admired Battcar approach, the Tides Marine Strong system, Sailpower System's Battslide, Martin van Breems' Dutchman, and Antal's HS system.

We've also looked at systems from Facnor, Rutgeron, Sailman, Schaefer, and Selden. Such low-friction systems designed and built to handle the loads generated by full-battens under pressure fall into two basic categories: those that use a dedicated track attached to the mast, and those that utilize a slide or car fitted for the existing groove in the spar.

Over the course of three decades, *Practical Sailor* has been tracing the evolution of these sail-handling systems, and in our view, this is a nut that has yet to be cracked. The introduction of better materials, such as high-tech fibers or composites have brought incremental improvements, but we've seen no revolutionary advances in the art of handling mainsails, and certainly no perfect system.

Tartan Yachts recently capitalized on materials advances to refine "the Park Avenue boom" for the average sailor. Its carbon-fiber Stow-Boom neatly catches a fully battened sail. Martin Van Breems' Dutchman has similarly been improved, but the concept has been the same for years. Meanwhile, in-boom furlers like Forespar's Leisure Furl have also begun employing new materials and design technology to better manage modern mains.

The other mainsail handling area that has undergone a lot of development in the last few years, is reefing. Point reefing (as well as slab and jiffy reefing) remains the simplest, most reliable, and cheapest approach to shortening sail. It can be fancied up with single-line controls and blocks of various kinds, but it's simply an extra set or two of tack and clew cringles and a line or two in the sail. Ease the sail down (the halyard can be marked to match clew and tack selections), secure the tack (on a horn or with the tackle), adjust the clew reef line and outhaul, rehoist, and tie in the reef pendants. Sounds simple, but it does take time, and a little practice.

Of course there are other systems. In its earliest versions, boom reefing (inside or around) often was a disaster. The Cal 20, for instance, had a spring-loaded boom that was intended to be pulled aft and then rolled in order to take up sail area. The problem was that the spring engineered to lock the ratchet teeth in place so that no further rotation occurred, was not



*The “Hunter Pak,” a combination lazy jack/sail cover on the new Hunter 31 is well suited for the deep-roach mainsails that Hunter’s backstayless B&R rig allows.*

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strong enough. The main usually just unrolled itself when wind pressure was applied, which made a frightful noise. And, need we add that any around-the-boom system nullifies the use of a normal vang?

In the mid-1970s, Ted Hood introduced an interesting idea. Hood had a lot of them. This one he called the Stoway mast. Eventually, after considerable development, it proved a slick but terribly expensive way to manage the main. Of course this led to imitations, including versions that were mounted just aft of the mast. Besides the expense, the most frequent criticism of in-mast furling is that the mast becomes heavy and the mainsail cannot have horizontal battens, though new systems with vertical battens are now emerging. (See Chapter 6 for more on in-mast furling options.)

Tom Braisted offered this ultimate warning: “None of these fancy furlers are as reliable as you might like....or expect, considering the cost.”

\*Drablers — Drablers and bonnets were strips of canvas laced to sails to add area.

\*\*Euphroe — A crowfoot was a big flat board with multiple holes for hanging an awning, and a euphroe was an oblong block with holes that gathered, supported, and helped organize and adjust the crowfoot’s lines; neither word has survived in modern nautical terminology.

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## **Mainsail Handling Systems**

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The mainsail continues to be both the heart of most sailplans, and the bane of many short-handed cruising sailors. In its modern bigger-than-ever context, the sail’s overpowering presence can be so daunting to a couple that they daysail their boat with only the jib unfurled. Others spend tens of thousands of dollars to automate mainsail handling—winding it up in a specially designed mast or boom. In addition to being a costly option, these in-spar and in-boom furling systems add more weight and more complexity to the boat’s sailplan, while at the same time, decreasing the efficiency of the sailplan itself. On larger boats, such trade-offs can make sense because the mainsail becomes so large and unwieldy. But for boats in the mid-range, 30 to 45 feet, there are less costly and more sailing-friendly alternatives

to wrestling with an uncooperative mainsail.

Market analysis has shown that boatbuyers are indeed looking for bigger boats, and modern rigs that sport larger mainsails than ever before. This trend toward putting more sail area in the mainsail means that one jib can serve a larger wind range, which is most definitely a good thing. But the flip side of this bonus means that handling the larger, heavier mainsail becomes more of a chore, and

there are several tasks that must be accomplished in a timely manner. Setting and dousing the sail are the most frequent rituals, but unanticipated reefing and the dreaded thunderstorm-induced fire drill seem to generate the most anxiety.

The best way to get a grip on the situation depends on the skill, number, and agility of the crew. Racing crews and young, fit cruisers lean toward the equivalent of manual “stick shift” transmission on a car—preferring the simplicity of a mainsail equipped only with a halyard, topping lift (or rigid vang support) and slab reefing with no other form of setting or flaking aid. This is the lightest, fastest, least complicated mainsail arrangement, and it maximizes performance when the sail is hoisted and the vessel and crew are happily underway. However, when it comes time to reef, or douse the sail, this configuration can take on the demeanor of a clothesline-hung bedsheet in a gale. Barring significant intervention from the crew, the breeze decides where the leech of the sail will go once the halyard is released, and mainsail reefing and flaking can become a substantial chore.

Lazy jacks, cover/lazy jack combos, and the innovative Dutchman systems have grown in popularity in recent years, offering a more practical, affordable advantage in the battle to tame the main. For a 35-foot boat, prices range from about \$250 for a lazy jack kit, \$700 for the Dutchman, to anywhere from \$800 to \$1,500 (not including sail costs) for a lazy jack/sailcover combo. A close comparison of each of these options will provide some valuable insight into taking the gymnastics out of handling a mainsail.

### **LAZY JACKS**

For centuries, sailors have appreciated the value of lazy jacks, a set of lines that act as a sail-gathering guide, catching and coaxing the mainsail into a stack on top of the boom. When the halyard is released, the sail falls in submission on top of the boom as if guided by an invisible hand—at least that how it’s supposed to work when all goes according to plan. And when lazy jacks are properly set up and a few simple guidelines are followed, they are as much a friend to a modern sailor as they were to the short-handed schoonermen who coasted New England. However, in other situations, lazy jacks can snag a batten tip of a sail being hoisted, or on a dark night, a loose lazy jack can even snag a spreader tip just before the crew jibes onto a new tack, resulting in a very different outlook toward the system. In



*An electric screwdriver is used to attach clips that secure the Dutchman's line storage bags. (Photo by Ralph Naranjo)*

short, this double set of lines is put to use infrequently during a sail, but is permanently carried along for the ride.

It's essential that the crew develop a routine for setting and unsetting the "jacks" in order to minimize sail chafe and eliminate the chance that a spreader or any other protrusion is snagged. It's also crucial to keep the boat head-to-wind or at least have the boom in line with the wind when hoisting sail, and—to a lesser extent—when dousing sail.

### **COVER/LAZY JACK COMBOS**

Some sailmakers offer a mainsail cover that's attached to both the boom or sail and a set of lazy jacks. When the halyard is released, not only does mainsail drop to the boom, but it ends up in a cozy hammock-like cover and is just a zipper pull away from being completely stowed. This cover/lazy jack combination goes by several names depending on the sailmaker who builds it. One of the early innovators was Doyle Sailmakers with its StackPack—a combo full-batten main, lazy jack, and Sunbrella sail cover. The lazy jacks are fastened 50- to 75-percent of the way up the spar, and the StackPack is sewn directly to the sail. North Sail's QuickCover attaches to the boom track but functions like the StackPack. Mack Sail's Mack Pack fastens to the boom at intervals. Other sailmakers offer slightly different renditions of the cover/lazy-jack combo. All take the sail cover as well as the lazy-jack line system along for the ride.

Naturally, in our world of "no free lunch," there are always some strings attached, and in this case it's the lazy jack lines themselves, along with the Sunbrella or other acrylic cover that's part of the package. In some designs, the "jacks" are kept fairly taut and the cover is raised, while in other designs, the lazy jacks can be slacked and the cover is secured to the boom sides. Once a crew gets the feel for how these additions to the sailplan behave, they become less of an inconvenience.

### **THE DUTCHMAN SYSTEM**

In our testing, we found that the Dutchman system simplifies the lazy jack concept. However, it does mandate some additional sail work and minor rigging additions, but the cost-to-benefit seems a bargain. At the heart of the system are three or four light lines clamped to the topping lift that drop vertically through fairleads in the sail to small tabs along its foot, just above the boom. The mainsail is set up with a series of grommets that allow these lines to be laced through the sail, and when a mainsail has been properly trained to fold along its creases, it simply slides from full hoist to the boom.

The system's simplicity and functional design utilizes mono-

filament lines (some owners prefer Dacron) that are all but invisible, and the topping lift that they are attached to is already present on many sailboats. Aboard boats with a rigid vang or high-tech hydraulic vang, a topping lift still can be easily rigged to provide attachment for the Dutchman lines. The best bet is to set up the topping lift to function like a conventional halyard rather than a permanently fixed line near the masthead. One advantage of an adjustable topping lift is that should a mainsail halyard shackle get jammed in the topping lift, you can usually free the shackle by slackening the topping lift.

Once the sail has been lowered, both lazy jacks and the Dutchman system add a bit of complication to snapping a sail cover in place. In the case of the Dutchman system, covering up usually involves a series of small secondary zippers that accommodate the vertical monofilament lines. The traditional lazy jack system may only need to be eased a little in order to put on a conventional sail cover. Unfortunately, lazy jacks can also complicate mainsail hoisting by trapping batten tips as the sail gently flogs during the hoisting process. Many sailors prefer to ease the lines and gather the tackle together just behind the spar, keeping it there until it's time to douse or reef the sail. Care must be taken to ensure that the lazy jacks are stowed tightly. Many a newly painted mast has been dinged by the small blocks used in lazy jack tackle, hardware that can slap relentlessly against the mast when a breeze fills in and the lazy jacks have been poorly stowed.

Reefing lines were easy to use on all of the systems we tested. The most user-friendly systems took into consideration the stack height of the cars used on the mainsail track, and incorporated a block, pendant, and jam cleat tack rather than a tack hook to engage the reef point. The real challenge in many of these setups, however, was how a crew could cope with extreme conditions and the need to set a storm trysail. Once again, the Dutchman system, when set up with an adjustable topping lift, provided for the easiest transition to a storm trysail. All that had to be done, once the mainsail was lowered, was to slacken the topping lift and gather up the loose monofilament line—this cleared the area aft of the mast and allowed the storm trysail to be easily set.

### **CONCLUSION**

Mainsails up to about 250 to 300 square feet are easy enough to handle that flaking aids are optional rather than essential. Over this size, and up to about 500 square feet, any of the three options mentioned can be as valuable as an extra crew member. However, we found that the Dutchman system did get our most enthusiastic nod of approval, even though all three systems certainly improved mainsail handling significantly. Our testing revealed that the single set of mainsail-penetrating lead lines of the Dutchman system provided a more positive guide for the mainsail, directing it into a neatly flaked stack on the boom



with fewer strings attached.

The fact that each of these approaches allows a crew to use a well-cut conventional mainsail is a big plus. There's no need to succumb to an overly flat, roachless, in-mast furling mainsail, or a furling boom as heavy as an extra crew member. There is a point however, where the sheer size of the mainsail makes a mast or boom furling system a preferred option. (See Chapter 6.)

## MAINSAIL SOLUTIONS

Given the range of mainsails on the market, comparing pros and cons of the various mainsail handling systems is by no means cut-and-dry. Some systems are better suited for specific mainsail designs or size boats. And within some generic types—such as the lazy jack and stack-cover arrangement—there are slight modifications that suit certain boats or circumstances.

The accompanying table is based largely on experience of our many field testers and contributors. Generally, the baseline ratings apply to a modern sloop in the mid-30-foot range. To more closely quantify the differences in generic designs, our testers also compared two different mainsail handling systems on two nearly identical 40-foot production monohulls. One boat was equipped with the Dutchman system, another was fitted with a cover/lazy jack combo. In terms of hoisting, reefing, and dousing, the Dutchman scored highest overall. However, for boats over 40 feet, or in the case of a deep roach, full-batten mainsail, such as that found on a multihull, the scale can tilt in favor of other lazy-jack/cover type options.

## TRYSAIL TIP

Of all the details involved in choosing and fitting a mainsail handling system, one that is often overlooked is how to accommodate a storm sail. The trysail's dedicated luff track often begins on the mast below the boom so the sail can be kept on deck ready for deployment. Fixed lines in some mainsail handling systems will cross the trysail track, preventing a trysail from being easily hoisted. In such cases, the control lines should be easy to disconnect and, if necessary, stowed securely (usually along the mast or boom), allowing the trysail to freely set.

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## Reefing Preferences from the Pros

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We surveyed a cadre of experienced delivery skippers from around North America to find out what systems and gear they favor for reefing mainsails, and to find out what they don't like, and why.

When done properly, reefing the mainsail can be a graceful affair, a blend of art and science that keeps strong winds from tearing the sail to pieces while bringing relief to crewmembers who have been bouncing around on deck or in the cabin below. When a reefing line gets fouled or a halyard gets stuck or a block pulls out of the boom and colorful language comingles with the breeze, reefing the mainsail can become a high-seas calamity, and a certain precursor to unsafe situations.

High winds and building seas put a premium on equipment as well as crew expertise. Getting a proper reef tucked in means

PS	BUYER'S GUIDE		MAINSAIL HANDLING SYSTEMS		
	DUTCHMAN	LAZY JACKS	STACK PACK	STACK COVER	NONE
HOISTING	A	B	B	B	B+
SAILING	B+	B	B-	B-	A
REEFING	A	B	B	B	C
DOUSING	A	B	B+	B+	D
COVERING	B-	C	A	A	B

getting the boat back on its feet, and how effectively each component works alone—and within the reefing system—can mean the difference between an appropriately taut mainsail or a baggy foil with scalloped sags along the luff stressing the slugs or slides and a flogging clew that causes undue wear to both the sail and the reefing gear. All of this not only wrecks havoc on the gear and the boat's performance, but also on its occupants' safety and peace of mind.

\* \* \* \*

Andrew Burton of Newport, RI, is like several of the skippers we queried. He has sailed all over the world, logging some 250,000 miles in the last 30 years on boats that have had everything from iron hoops to the latest mast track systems.

"The best way to reef is sailing dead down wind," said Burton. "The boat is stable and less likely to be pitching around in the waves. For mast track hardware, I like the Harken and Antal equipment, they're both fabulous, especially Harken's Bat Car system for getting the main down and being able to reef it. The only area you have to watch out for in the Harken gear is the way the batten end is attached to the car; there's a pin, sometimes an Allen screw going into a nylon nut that can vibrate loose. It only happened to me once, on a charter boat, and not one that was maintained to private standards. Offshore, if it hits the fan with a bolt-rope system, you'll have a hell of a time getting the sail down; same goes for a roller-furling boom, you have to turn the boat into the wind to get the sail down."

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Stan Gauthier of Crew Service International in Vancouver Island, BC, takes the opposite stance regarding in-boom furling systems: "The top dog in my opinion is the Leisure Furl in-boom furler," he told us. "It's made in New Zealand and a really top-notch system.

"For jiffy reefing systems, the cheapest and most effective way to tame the main is The Dutchman. It's economical and really works. As the main comes down, the sail stays in line. The main problem in reefing on a bigger boat is that the sail piles up and slops over one side of the boom. The Dutchman guides the sail all the way down and keeps it out of the way.

"For blocks, I prefer Harken. By and large, they stand up to punishment, although I have seen some give way. A lot depends

*Having the right sail design and track hardware makes reefing much easier when the breeze builds. (Photo by Mahaina Expeditions)*

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on whether or not the blocks are used on a regular basis. If they're not, they can be troublesome, as can traveler cars, which can stick and generally make life difficult."

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"My feeling is that simpler is better," said Norman Connell of Bluewater Yacht Delivery, based in the Chesapeake Bay. "A lot of people are under the impression that if you have all the reefing lines led back to the cockpit, you'll never have to go up on deck, but you end up having to go up there anyway, whether it's to put the cringle on or untangle something. I'd rather do it at the mast.

"And a lot of people are afraid to reef the main so they wait too long to do it and that can lead to problems. Often people take a reef in their headsail before reefing their mainsail, and then you end up with too much weather helm.

"As far as single-line systems go, anytime there's a line in the boom running on a block that's inaccessible inside the boom, it's just an accident waiting to happen. I prefer slab reefing with a cheek block on one side of the boom, everything led to the gooseneck, with a winch set on the mast for tightening the clew tension.

"As far as line clutches, I'm of the sort that dislikes most gadgets—they instill a false sense of confidence in what people can do. I prefer single arm cams on the boom for securing reeflines. Isomat makes their booms this way, as do other manufacturers.

I haven't had any problems with The Dutchman system, but I do know some skippers who have had the lines shred; if you don't have full-batten sails with really heavy battens, you don't really need it. Ditto for lazy jack systems—if you have to head into the wind in really rough conditions just to get lazy jacks untangled, it's just not a good trade-off.

"It's been years since I've had any blocks fail on me, but I'm not out stressing the rig, going for that extra tenth of a knot. I sail conservatively and don't try to break things."

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"Slab reefing and in-mast furling both have their merits," said Bob Fritz of Compass Rose Yacht Delivery in Milwaukee, Wisc. "I've sailed somewhere near 7,000 miles on an Amel Super Marmu that had in-mast furling, and although I never had a problem with it, I come from a racing background and I found the mainsail shape troubling on that rig.

"The majority of boats I've sailed have had slab reefing, and it works well. There was one boat I delivered with a one-line system, and I didn't like that too much—there was too much friction on the line as it runs through all the required blocks.

"I've used The Dutchman, which worked well to get the sail down and keep it contained. I've also used the StackPack, which I didn't like. It contains the sail when you drop it, but

the battens have a tendency to get caught on the lazy jacks when raised. We were headed to Bermuda and had some pretty big winds and seas. When the wind dropped from 40 knots to 25, we tried to put the main back up, but had to turn into the wind and some big seas to get the sail up, and the battens kept getting caught. It was frustrating at the time, but humorous to look back on.

"I use Harken Air Blocks on my own boat, a Hinckley Pilot 35. As for line clutches, the early Spin Locks were a pain—they were hard to release and chewed up the line, but the modern ones work well.

"When setting up a boat for reefing, I prefer lines led to the mast or boom rather than aft to the cockpit, because you end up having to go up there anyway. Most of my experience with line clutches is with Spin Locks. They're simple and reliable. I haven't had any problems with shackles deforming, but I have had some open by accident if they get hung up on something just right."

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"Redundancy is the most important thing to a delivery skipper," said Jeremy Steele-Perkins of Ocean Captain's Group, based in Canandaigua, NY. "I've reefed boats of all sizes with jiffy reefing, and used in-mast furlers with some others. With jiffy reefing, if a block pulls out of the boom or some other piece of hardware gives, there's a chance to jury rig it. With in-mast furling, things get more interesting.

"I'm a Harken devotee and have a preference for their blocks and gear. This is a first-class company and has an extremely good training program for their dealers. As far as rope clutches, I prefer these over cleats. With a clutch, should it fail, you can always use a cleat as a back-up, not so with a cleat. And most clutches have evolved over the past 10 years to be very reliable.

"When we get a boat for delivery, we survey it, but a lot of the gear is still an unknown until we put a load on it. Lazy jacks are nice to have, especially on larger, full-batten mainsails like those found on Freedoms, and this is what I have on my own boat. I've heard good things about The Dutchman, aesthetically it looks nicer than lazy jacks. The Stak-Pak is also very nice, and while this isn't exactly what it was designed for, we once used it as a sail in 50 knots of wind.

"Generally, I prefer lines led aft to the cockpit on a boat. The less you have to go forward, the more elements of danger

you're avoiding. We usually sail with a crew of three, so the more that one person can do in the cockpit, the better for the rest of the crew."

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"New mainsail handling equipment seems to be a really good idea when the weather's pleasant" notes Patrick Childress, who has delivered a lengthy list of boats and co-authored *A Cruising Guide to Narragansett Bay and the South Coast of Massachusetts*. "But as soon as the wind picks up, the more intricate such equipment is, the less likely it works well.

"Intricate mechanical systems like in-mast furling tend to bind at higher wind speeds, especially when you're dealing with a big mainsail that rolls into a mast and must go in perfectly.

"As far as blocks, I go with whatever is there and don't really have a preference for one manufacturer over another. One really good idea is to use a block on a reefing cringle, which eases friction on the metal eye.

"I prefer slab reefing, and used to be an everything-at-the-mast guy, but now with many boats you can reef pretty well from the cockpit. If I do have to go forward, I like to have 'sissy bars' to hang on to.

"As for securing reefing lines, it depends on where the line terminates. If it's led back to the cockpit, I prefer a cleat, like a jam cleat with a breaking device to free the line."

\* \* \* \*

"The installation is everything," noted Adam Smith, who occasionally works with Echo Yacht Deliveries of Newport, R.I. "Keeping friction and chafe to a minimum is critical in how well a reefing system is going to work, regardless of whether it's a single- or double-line system. I prefer roller bearing blocks that keep friction low and use Ronstan and Harken the most.

"As far as mainsail handling systems, the Stak-Pak does a nice job of collecting the sail and works well for quick hops, like between islands in the Caribbean. I've found it causes a little chafe on full-batten mains and I like to have extra webbing stitched over batten pockets to protect them.

"Regarding the components of a reefing system, I like sail-taming systems like the Doyle StackPack and The Dutchman, if they're sturdy enough. Part of their appeal relates to how often you have to reef. In windy places like San Francisco Bay where sailors tend to reef pretty regularly, one is more likely to appreciate these systems.

"And about mainsail reefing layouts, I have some mixed feelings. The traditionalist in me says leave the controls at the mast, which is the way it is aboard my own Pearson 35, but being able to reef from the cockpit obviously has its advantages. Principally, it keeps people off the deck in nasty weather, but often you induce more friction in the system by running all the lines back to the cockpit."

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Capt. Bernie Weiss of Atlantic Yacht Deliveries in Stamford, CT, told us that he prefers to have deep reefs in the mainsail

unless the boat is set up for racing. "I don't believe in shallow reefs. On my own boat—a fractional-rigged Tartan 33—I have two reefs. The first one reduces the mainsail by 15 to 20 percent, and the second takes out roughly the same amount.

"It's a slab reefing system, and all the controls are at the mast. The main halyard is made fast there, so everything is within arm's reach when I get up there to reef. I've got a small, single-speed Lewmar winch mounted on the boom to achieve tension on the clew reefing line. In fact, all the winches on my boat are Lewmars, they're just so simple to maintain and reliable. That one is 25 years old and it's never given me a even a minute of trouble. The blocks I use are Schaefer and Nicro-Fico. Both are quality products at reasonable prices.

"I don't use a reefing line for the tack, instead, I've had the cringles in the luff of the sail fitted with earrings—stainless steel rings that are connected through the cringle by webbing—and I simply slip those over the tack horns on the gooseneck. This system is very straightforward and simple. It doesn't take me much longer than a minute or a minute and 15 seconds to tie in a reef. Of course it helps to have someone in the cockpit working the helm, mainsheet, and traveler."

Weiss stressed that there are a lot of variables that should be taken into account before one decides on a reefing system and its components. "You have to know whether the boat is to be raced or cruised, whether the typical crew is experienced or still learning, as well as what prevailing wind and general weather conditions the boat will be sailing in. Likewise, things like dodgers, which can interfere with someone's ability to fold the main, and mainsail fabric—whether it's heavy and stiff or light and soft—are other important factors.

"Still, there are some general principles that apply to reefing mainsails. Reefing early, before it becomes absolutely necessary, helps. For example, if I'm sailing in the ocean through the night, even with excellent wind and sea conditions, I will typically reef the main before sunset to avoid having to do so in the dark. If sailing a tender boat short-handed, I may put in a reef before I leave the dock so that when I set the main at sea, it is pre-reefed. A forecast of foul weather will also prompt me to reef early.

"The system you know and are comfortable with—whichever one that happens to be—is the best system. When initially encountering a new or unfamiliar reefing system, I would suggest reefing the main a couple of times in good weather before facing any nasty weather. Be certain that the reefing system functions properly and that you know how to get the job done quickly and efficiently. This way you can work out the optimum sequence of maneuvers, which crew is to work at which winch with which lines, and all those other important details. Simple is better than complex. The fewer lines and less tackle—the minimum gear to get the job done—is what I prefer."

## CONCLUSIONS

In order to ensure that the information derived from this survey would be as representative as possible, the respondents were deliberately chosen using two criteria: the depth of their experience, and their varied geographic locations. Admittedly, the comments compiled don't address every item of gear involved

in the mainsail reefing systems that PS readers use, and many of our respondents' remarks are general in nature. Still, it's clear that this group of professionals favors systems that are cleanly laid out, and simple in nature over those that have inherent complexities. Essentially, they favor slab or jiffy reefing systems, and prefer those set up with two lines rather than one.

Surprisingly, most don't feel it's overly important to lead reefing lines and halyards back to the cockpit, a reflection of their leaning toward simplified systems. By general consensus, these

sailors aren't big fans of in-spar furling systems, whether in the boom or in the mast. Again, they told us that this is mostly due to the complex nature of these mechanisms relative to slab or jiffy reefing alternatives.

Regarding blocks, three out of the eight respondents prefer products from Harken Yacht Equipment; one mentioned Ronstan, and one Schaefer and Nicro-Fico. There was no clear consensus regarding rope clutches vs. cleats, but Spinlock was mentioned most often as a reliable product. ▲

# Chapter 6

## Furling Mainsail Options

### *In-mast Furling Systems • In-boom Furling Systems*

From the outset we'd acknowledge that with each passing year, sailhandling systems get more and more refined and efficient—never mind the days of footropes and gaskets, of one hand for the headsail and one for yourself during routine jib changes.

Even so, the mainsail remains a challenge. Stacking systems, lazy jacks, the Dutchman, in-mast furlers... all contribute their share of convenience and control, but none has proven to be the answer. Stowing, furling, and reefing the main is still a sizable chore, especially as the size of your boat increases. And, as always when we attempt to conquer the considerable forces of wind and wave by mechanical means, we tread a fine line between convenience and chaos.

### ***In-mast Furling System***

The most valuable advances in sailing hardware are those that achieve the dual goals of improving performance while also enhancing convenience. Think of the rigid vang, the ratchet block, and even some roller-furling units. Juxtaposed with the systems that predated them, these devices represent solid advances in equipment engineering.

However, some approaches to engineered convenience fall short of delivering improved performance, and that has long been the knock on in-mast furling systems. Three specific criticisms are most often heard: These systems add unwanted weight aloft due to the increased size of the spar section and its furling components; performance is compromised because the sails used in these systems are necessarily smaller than conventional mainsails due to the need to furl tightly (thus eliminating battens that would support greater roach areas); and the furling slots can whistle in strong winds.

Seldén Mast Inc.'s in-mast furling system addresses these concerns in a progressive manner. The Sweden-based mastmaker refines its extruded aluminum sections ongoingly to achieve the optimum functionality as well as weight-to-strength combina-

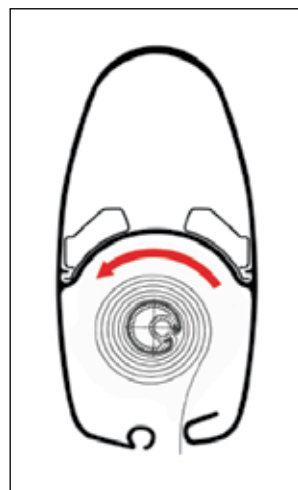
tions. Though these spars are only marginally lighter than those the company was building previously (and certainly heavier than conventional spars not equipped for furling mainsails), they're nonetheless a step in the right direction.

At the heart of this in-mast furling system is a patented device that evenly distributes the loads on all the stainless-steel bearings in the upper and lower furling units. Because these spars can be tuned to have up to 8 inches of pre-bend, making sure the furlers can rotate is critical.

According to Tom Sharkey, the general manager of Seldén's U.S. facility, all of the spars and sections (spreaders included) that arrive for assembly are extruded from tempered aluminum. Each comes coated with 20 microns of anodizing, as do all the cast aluminum parts that get attached to the masts and booms—like exit boxes and winch bases, etc. These parts are also coated with a lacquer finish for extra protection. Nothing is welded to these spars as that would compromise the metal and require it to be retempered. Instead, everything is fastened with monel rivets or attached by stainless machine screws that are first treated with a coating of epoxy (thickened slightly with microballoons) to prevent any corrosion due to dissimilar metals.

We examined Seldén's in-mast furling system on board a Hunter 460 in 8 knots of breeze. This boat is fitted with a UK mainsail with no battens.

To deploy the sail, you simply vang the boom down, release the mainsheet and the continuous furling control line, and



*To ensure that the vertical battens don't jam inside the mast cavity as the sail is unfurled, Seldén fits each spar with a guard just inside the mast slot. Additionally, the slot is off-center. This asymmetrical arrangement means that the sail will furl smoothly on and off the foil. (Photos courtesy of Selden Mast)*

pull on the outhaul. (For larger boats, the system is available with an electrical or hydraulic motor.) It took us a couple of strong tugs to get the sail rolling, but it ultimately unfurled easily. We furled the sail back up, which took about six full pulls, and less than 15 seconds. When we unfurled the sail a second and third time, the system worked flawlessly.

Sharkey told us that the system can furl the sail with little friction even in strong winds while reaching. We found furling or unfurling the sail to be a simple, one-person task, and we like the idea of being able to reef the sail in such small increments.

Should the continuous control line become fouled, there is a direct-drive apparatus affixed to the back of the spar just below the gooseneck as a backup. This is a 2:1 gear mechanism that is driven by a winch handle. It has a locking switch on it that enables the user to choose between “free-wheeling” or “locked” modes. When underway in normal conditions, it would be kept on the “freewheeling” setting. If the boat were to be left untended for prolonged periods, moving the switch to “locked” means that the sail cannot unfurl on its own.

But what about that criticism regarding sail size? A number of sailmakers have developed solutions to the problem of diminished mainsail area brought on by the inherent restrictions of in-mast furling systems. Doyle Sailmakers’ Swing Batten system is one, but Sharkey and his colleagues worked with designers at Doyle-Ploch Sailmakers in St. Petersburg, Fla., to develop sails with full vertical battens (with carbon tips for added stiffness) that both furl easily into the mast cavity and support additional sail area in the roach.

Bill Durant, one of the designers responsible for many of the refinements on these sails, said mainsails can now have substantial area added to the leech, achieving up to 11 inches of roach that projects beyond the erstwhile leech. His loft has built dozens and dozens of these sails, so he feels they have the quirks worked out. That the sails are now standard equipment on Hylas Yachts is compelling evidence. And Hunter Marine, which outfits most of its new boats with in-mast furling, appears to be following suit.

To ensure that the vertical battens don’t jam inside the mast cavity as the sail is unfurled, Seldén fits each spar with a guard just inside the mast slot. Additionally, the slot is off-center. This asymmetrical arrangement means that the sail will furl more smoothly on and off the foil.

Both Durant and Sharkey admit that these new vertical-batten mains don’t support as much roach area as mainsails with full-length horizontal battens, but they think it’s more appropriate to compare vertical-batten sails with others that can also be furled. “If you compare these new sails with those that have full horizontal battens,” said Sharkey, “then you also have to factor in the ease of operation, and that’s where in-mast furling is so appealing.”

So, what are the drawbacks? Cost, weight, complexity, and sail shape are crucial here. An in-mast furling spar and its attendant equipment sells for roughly 30% more than Seldén’s conventional spar. Add the increased cost of a sail fitted with vertical battens, and it’s a substantial difference. Selden is addressing the issue of weight and has minimized the complexity of its furling gear, but getting the optimum shape into a sail with vertical battens remains a challenge. Finally, there is the elephant in the

room for an offshore cruising sailor—a mast-furling mainsail jamming in a gale, or a when you need it gone in a hurry.

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## ***In-boom Furling Systems***

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There’s no perfect solution to boom furling. It’s not an easy bit of engineering. In the late ’80s, Hood Systems introduced the Stoboom, and rolling the sail inside the boom became an option. More affordable and less risky than furling the main inside the mast, these boom furlers were a big hit. However, the newly engineered hardware proved to be more complicated and ultimately less convenient than it looked. It was, according to one owner who sailed a Hunter 42, “the costliest consumer mistake I ever made.”

The sail entered and exited the Hood boom through a narrow slot in the top of the tube. For that and several other reasons, Stoboos proved jammable. They were also fickle in terms of boom angle, and costly in terms of luff chafe. Hood tried education (a special aftermarket owner’s manual) and hand-holding (extensive customer service) before eventually pulling the Stoboom off the market. “However,” says Paul Boyce of Hood Yacht Systems, “we’re still involved in in-boom furling with hydraulic systems fitted to larger boats, most of which are in Europe.”

The advantages of in-boom furling that prompted Hood’s “noble experiment” have not disappeared with Stoboom. Compared with in-mast furling, the boom-based systems weigh less and keep weight lower. Probably the most significant selling point of a sail that lives in the boom, however, is its shape. In-mast furlers often require roachless, high-aspect triangles, thus reducing mainsail area, distorting ideal shape, and lessening draft control. We’ve talked with sailmakers, and most peg the overall performance loss that you’ll pay for the convenience of most in-mast furling systems at 20 percent or worse. With a boom-furling system, you can assure yourself of a powerful modern sailplan with plenty of roach, with the additional bonus of being able to use full-length horizontal battens to help control sail shape and reduce flogging.

There are other plusses—freedom from reefing-line clutter, variable sizing potential, automatic sail-covering, and the ability to retain your original spar, to name a few—but to us, the most telling difference is safety: If an in-mast furler jams, it’s probable that someone will need to go aloft to free it. Until then, you’ll be stuck with a hoisted mainsail in what may be exactly the wrong conditions. A jam in the boom can be addressed from on deck. If all else fails, just drop the sail as you would a normal main and furl it on the boom instead of inside.

But boom furling has plenty of detractors. Butch Ulmer, veteran sailmaker from City Island, N.Y., feels cautious about it: “The geometry still needs to be worked out. Big roaches drive battens forward. Overcoming that friction isn’t easy and it’s certainly not automatic.”

We asked the owner of a 73-footer who undertook a complete and costly refit why he hadn’t put a boom furler aboard. “I don’t need a \$20,000 sailcover,” he replied.

Peter Harken, whose company makes headsail furling sys-

*The Leisure Furl in-boom furler is nearly topless. Its wide gutter is covered by a sliding sail cover.*

.....

tems, said, “We haven’t gotten into in-boom furlers because we think there’s a better way. We may be a bit prejudiced, but we feel that the batt-car system we’ve devised is the safest, surest, easiest way for getting a sail up and down easily and when you really need it. I can just about guarantee those cars won’t jam, and you can’t say that about anybody’s boom-furler. Most of these systems work most of the time, but when you really need it, give me something that’s simple and foolproof.”

### THE IN-BOOM FURLING FIELD

We reviewed five in-boom systems. We’ve sailed them all, noting design, construction, and performance. Given the conditions, we did our best to see how each delivers on the promise of boom furling, and at what price.

One overall conclusion is that, while Stoboom may have spoiled the boom-furling parade for lots of sailors, today’s systems really work. We put the gear through paces that occasionally created problems, but those snags never kept us from executing our set/reef/reset/douse evolution.

Schaefer and John Mast have relatively narrow openings in the top of their booms, but among the others, there’s a trend toward open-topped extrusions.

You can still hold the boom up with a topping lift while rolling the main in, but all the systems we saw used a fixed, solid vang to do the job.

While you can get by without power winches, the whole process of setting and reefing, especially singlehanded, is easier if your winches have power. This is not to say that there isn’t a certain swashbuckling appeal in rolling the sail with one hand cranking the self-tailer and the other easing the halyard (keeping good tension for a nice tight roll).

Though they share the same basic idea, the five systems are significantly different. So are the companies that produce them. Leisure Furl has been around since the early ’90s, and its track record and testimonials are impressive. Schaefer Marine, a well-established hardware company, on the other hand offers a system born of three years of design and development. ProFurl engaged in extensive aerodynamic testing and material analysis before introducing a boom-furler. The big French company with dealers in 52 countries has since been energetic in promoting boom-furling to both the general public and among sailmakers.

Furlboom (“designed and built in Australia by Aussie yachtsmen to suit our rugged sailing conditions”) has had a varied career and is now built and sold by Yachting Systems of America in Costa Mesa, Calif. Like Leisure Furl, the company has con-



centrated efforts on centralizing manufacture and now offers a system that is entirely American-made.

The John Mast (JM) Hi-Low Reefer is imported from Denmark by Lars Pedersen of Bente Trading Co., Mercer Island, Wash. Pedersen has long been a boom-furling zealot; he worked with the Danish mastmaker to develop the system.

### LEISURE FURL

Over a decade ago, New Zealand sparmaker Don Baverstock first came out with his roll-up system.

Today KZ Marine, for whom Baverstock is a consultant, claims that “over 85 percent of the new boats launched in New Zealand have our booms.” Says Bill Hanna at Forespar, U.S. manufacturer of Leisure Furl, “Our system began with bigger boats and has evolved into boats closer to the everyday as it has gone along. The point is, we’ve been dealing with loads that are very significant right from the outset.”

The first thing you notice about the Leisure Furl system is that the boom is virtually topless, with a wide “gutter” covered by a clever sliding sail cover. It has an attractively tapered silhouette and affords the convenience of letting you see and service the innards. The two key elements in the furler, however, are its “through-the-mast” drive shaft and the universal joint that joins it to the mandrel at the gooseneck. The “free-floating” universal means maximum power can be applied to rolling the sail. (Leisure Furl was the only manufacturer to use a universal; the other four systems rely on drum drives).

“We found it incredible that we could furl downwind in 50 knots in Bass Strait in the Sydney-Hobart Race,” reported one user.

Chuck Poindexter (Sound Rigging, Essex, Conn.) has installed multiple Leisure Furl units. “I was surprised to learn when we had a naval architect do the calculations that the drive shaft actually strengthens the mast...by 11 percent to be exact. When I first got involved, it was because a customer wanted me to survey the gear on a boat that had made one and a half circumnavigations. It had a Leisure Furl. I ‘dissected’ the universal and it was perfect.”

Other components include a foot groove halfway from tack to clew. It captures a short bolt rope on the middle third of the sail, holding it to the mandrel. With a loose-floating tack and two-part clew pendant, you can roll the sail (similar to the first rolls of a custom-luff headsail) so that the middle rolls in while



*Schaefer's in-boom furling system includes two bearing races, one at each end of the boom.*

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## SCHAEFER MARINE

Fred Cook at Schaefer says, “We’ve studied some of the problems associated with boom furlers for quite some time and tried to come up with answers.”

To reduce friction, the company’s new design incorporates four bearing races, two at either end of the boom. Made of Torlon, the bearings require no lubrication and are meant only to be flushed occasionally with fresh water. Hoisting the sail by hand felt significantly easier than with any of the other systems.

To handle the transition between the mandrel and the mast groove, Schaefer developed a unique and practical “sugar scoop” guide piece. While we tested only in medium (12-15 knot) air, it seemed superb at sliding the sail back and forth from mandrel to luff groove.

The drum is mounted on the after end of the boom and worked via a single control line. The gooseneck pivot pin is hefty and made from 316-stainless bar stock. We wondered if the luff groove, a UV-resistant polymer, was as sturdy as the rest of the unit, but from the flogging that we put it through on our test sail, it seems ready to withstand realistic abuse.

The track articulates with the boom, and this makes power-reefing (without completely depowering the sail) possible.

It’s good seamanship to take the strain off sail and gear by luffing the sail and/or bringing the boat into the wind when it’s time to reef or douse your mainsail. In a race, or due to navigational needs, however, this isn’t always possible. With the Schaefer system (and all others except ProFurl), you can reef without totally depowering the sail if you must. We think that adds to a system’s versatility and tolerance for error.

## PROFURL

ProFurl puts its furling drum (very similar to a headsail furler) at the forward end of its open-topped boom. ProFurl’s other salient feature is its articulating luff track mounted aft of the mast. Positioned to pick up and deliver the luff tape directly from the boom, this set-up has proven chafe-free. According to tests conducted at France’s Research Center for Nautical Architecture and Industry, the structure actually increases mainsail efficiency by energizing the airflow over the sail.

As with all of the mainsail furlers, the angle between mast and boom (or tack angle) is critical. Like most of its competitors, ProFurl specifies an angle of “about 87 degrees.” We found that this precision wasn’t absolutely necessary. If the boom is cocked up a bit more than perpendicular it pulls the sail aft and helps it lie smoothly in the boom. Lower the boom end, however, and the sail will bunch at the forward end of the boom, leading it to jam.

ProFurl provides a mechanical vang with a limiting wire: Release the vang, and it sets the boom at the right height for furling. Reef the sail, then trim on to adjust vang tension for shape control.

We did all of that, and were rolling a reef in when, in an effort to stop some of the sail’s considerable flogging, we took just

tack and clew stay loose. What this gives you, we soon realized, was a flattening reef that offers an elegant range of draft control by adjusting the furling line while keeping the halyard tight.

A significant difference between systems is how they attach to the mast. Leisure Furl uses a conventional luff tape, captive in a “self-aligning” feeder that leads to a fixed luff groove. Dr. Robert Leaf, one of the first Americans to put Leisure Furl on his boat, had a big problem “chewing up luff tapes to the tune of three or four a season.” Cutting sails to minimize “pullback” and new, tougher luff tapes seem to have solved the problem.

“It’s how the sail drops at the tack,” Poindexter says. “If it drops right onto the mandrel, you’re fine. I’ve been impressed that Leisure Furl has continued to evolve and improve.”

With halyard tension and boom angle, you can control how your sail rolls onto the mandrel to a large degree.

Leisure Furl’s chafe problems at the tack seem to be its biggest Achilles Heel, and one to which sailors can address themselves as they learn their systems.

Leisure Furl is moderately encouraging about retrofitting your old mainsail to suit the system, but we wonder if it isn’t something of a false economy to marry top-of-the-line furling gear with a recycled sail, given the critical nature of how the sail fits and is reinforced. Because of the number of components, relationships, and variables, we think Leisure Furl’s “riggers only” installation scheme makes sense, too.

## JOHN MAST HI-LOW REEFER

This reefer is the departure point from which the others have developed. The main idea at its inception was to make boom furling easy and accessible. Judging by the more than number of boom furlers now afloat in Europe, it worked. The Hi-Lo gooseneck bracket is adjustable, and job one is mounting it to your mast. The boom is open at its forward end for sail access and transfer. The sail’s bolt rope is inserted in a flexible PVC luff track, which can be fitted to the mast in different ways. The system is simple and works well, but it does not appear as solid as its rivals. (Even the furling drum looked somewhat undersized to us.) When we rolled in a reef (using a handheld electric winch grinder) a pleat formed along the boom. Rolling the sail out to re-reef did the trick, but the full-length battens pushed forward of the mast track and created more friction than we thought reasonable.

With the John Mast and the other in-boom reefers, it’s best to reef down to a full-length batten, which can then help support the foot of the sail. Being incompressible, it acts like an outhaul to keep the cloth stretched well aft. “Infinite” reefing between battens is discouraged.



*The furling drum is mounted on the aft end of the boom in the Schaefer furling system.*

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the slightest tension on the mainsheet. The sail immediately bulged larger at the forward end of the mandrel until it would no longer roll. We reset and re-reefed with no problem, but the incident made us mindful of the delicate balance involved in boom furling.

Retrofitting your old sail is possible. One sailmaker advises, however, to “throw out the ProFurl formula for dealing with luff curve. Anything greater than two inches of luff round is too much, period.”

ProFurl USA in Fort Lauderdale says installation of its unit is “relatively simple.” Their elaboration: “An owner with some mechanical savvy and a rivet gun can do it himself, but it takes 16 man hours and some work aloft.”

ProFurl has gone to ball-bearing sheaves, and wire halyards can now be used with the systems, which come with a three-year warranty.

## FURLBOOM

One of the secrets of this furler is the way it’s built. “We have gusseted corners that make our entire extrusion structural,” says Dougal Johnson at YSA. “That lets us build a lighter, smaller boom that is still more than strong enough to do the job.”

The Furlboom drive mechanism is mounted on the after side of the mast and connected via a drive chain to the mandrel. We’ve heard of one of these chains failing, and think that provision for a manual backup would improve the system. An excellent feature, and one shared with Leisure Furl, is a locking mechanism that takes the strain of holding the sail in place once the sail is set (or reefed). This ratchet engages under spring tension and is released by a trip line controlled from the cockpit.

Like most of the other systems, Furlboom employs a claw inside the boom. This guides the sail, both coming and going, and helps to assure a uniform roll. This is one of the several design features that enables Furlboom to handle rigs with considerable pre-bend (up to 8 inches, according to Johnson).

Like many of the systems we looked at, this one has had success on the race course. Johnson points to a Catalina 470 that came in fourth in class in the recent Ensenada Race. Toby Ritter, who took us for a demo sail aboard Tiger Too in Long Island Sound, raced his Furlboom to Bermuda. However, when you see the slick “automatic” sail cover that you can slide into place once the sail is put to bed, it underscores the fact that you can’t knock boom furlers for cruisability.



## CONCLUSIONS

The thing we liked least about in-boom furlers is the intimidating welter of controls, prohibitions, and caveats that go with them. There are plenty of reports of furlers gone bad, despite the reasonable efforts of their owners. In any case, sailors should be free to explore their limits and develop mastery of them without undue fear of expensive failures.

The thing we liked most was the amount of research and development talent that this rolling target has attracted. Chart the progress from Stoboom to the present, and you’ve got a record of innovation and clever design that makes the marine industry look pretty smart.

It’s hard to assign ratings to systems we’ve only evaluated short-term, and not in conditions that might demonstrate the survival of the fittest. But here are some basic assessments:

Pricing was essentially the same for all furlers—in the \$7,000 range, except for the nearly \$10,000 Leisure Furl.

The John Mast reefer is an older design, and the company has yet to establish an aggressive sales presence in North America. Price includes a boom vang, but not a sail.

ProFurl gets high marks for convenience and quality. Price includes a solid vang and boom brake.

Schaefer’s promising unit looks like it will fill the need for a simpler system that people with small to mid-sized boats can use and afford. Price does not include the boom vang.

We think that Furlboom is an excellent value, despite the fact that the boom vang is no longer included.

Leisure Furl still strikes us as the most-rugged, best-proven unit. If you’re willing to pay the freight, that reefer will render good service and excellent convenience, but our feeling is that Leisure Furl’s competitors have closed the gap and make attractive alternatives. ▲

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