

# GMT Carbonics

# 29

GMT Composites

Advanced composite engineering and manufacturing  
for marine and industrial applications

Product Bulletin #29



## Shallow-draft cruiser has GMT PowerFurl™

In an ironic twist, the first Southerly 57RS from British boat-builder Northshore Yachts will be bringing her GMT rig right back to Rhode Island after this attractive cruiser's debut at the Annapolis Sailboat Show. In addition to her GMT mast, this new Southerly flagship has the ultimate in furling booms, our GMT PowerFurl™.

Dubois Naval Architects designed the 57RS as a shoal-draft cruiser that could be easily handled by one couple. Her underbody exploits Southerly's unique Swing Keel system: pressing a button, her 10'-6" (3.5m) draft for exceptional bluewater performance reduces to just 3'-6" (1.05m) for gunkhole exploration. For a yacht with 51,099 lb (23,178 kg) displacement and luxury, this shallow draft is utterly amazing.

Under sail, the rig and hull give nothing away: the 57RS is a fine performer. Her GMT carbon mast towers more than 83 feet over the water. Under a double-headed sailplan, she carries 2744 sq.ft. of plain sails plus over 2000

sq.ft. of asymmetric headsail – a lot of horsepower even if she was a deep-keel cruiser/racer of this length. The light weight of her GMT rig helps reduce heeling and pitching moments and allows more sail area without burying the rail, making the 57RS more comfortable to sail in a wider range of breeze.

GMT's PowerFurl boom lets her owners reduce mainsail area without having to head close to the wind as virtually all other furling booms force you to do; this is both a comfort and safety advantage. PowerFurl also avoids drilling a hole through the mast for a winding motor drive shaft.

Northshore Yachts, established in 1971, is the largest builder of sailboats in Great Britain, best known for their Southerly brand as well as the versatility of their Swing Keel, proven in more than 800 of their cruisers.

If you miss seeing this stylish new yacht at Annapolis, you can get a good sense of her at [www.northshore.co.uk/Flash/S57RS.htm](http://www.northshore.co.uk/Flash/S57RS.htm).

## David Schwartz: we knew him when...

Work stopped at GMT on June 24 so staff, friends, family and neighbors could celebrate the achievements of David Schwartz, GMT's owner and president, on GMT's 25th Anniversary.

GMT has pioneered lightweight carbon composites since 1984, when only a few people

were fully aware of their potential. The need for lighter, stronger, stiffer construction isn't exclusive to sailing, but many of GMT's earliest projects were used in cruising yachts (carbon was then prohibited in racing yachts).

Today GMT designs and builds carbon composites for cruisers and

racers, power and sailing megayachts, plus military craft and commercial vessels, and for many other markets, including silicon wafer-making, battlefield tools, aircraft interiors, and medical scanning equipment. By advancing the science, GMT stays at the forefront of the field.





# Sloop *Lady B* steers for the deep blue sea

The 44.7 meter (147 ft) sloop *Lady B* was launched in June from her builder, Vitters Shipyard BV (Zwartsluis, the Netherlands). A barge transported this slim and elegant aluminum yacht, designed by Dubois Naval Architects, because she draws too much for Dutch canals.

Previous issues of Carbonics have chronicled *Lady B*'s development and shown the 6-meter (20 ft) tall carbon composite rudder GMT supplied to Vitters. These pictures give a sense of scale for yacht and rudder: note the car parked below the rudder for the barge journey.

The design brief called for "combining exceptionally high performance with superlative comfort." With the interior by

Rhoades Young Design executed in walnut, *Lady B* displaces 240 tonnes and is driven under sail by 1021 sq.m. (10,986 sq.ft.) of plain sails and a 666 sq.m. (7,166 sq.ft.) Code-O; her carbon mast towers 54.7 m (179 ft) above the ocean.

That much sailplan on a 40.2 meter (132 ft) waterline will generate huge loads on her appendages. The loads exceed what could reasonably be handled by an aluminum rudder; an adequately sturdy steel rudder would weigh far too much.

That's where GMT and our carbon solution comes in. This is the second rudder GMT has built for Vitters' sailing yacht projects and we look forward to building more in the future.



With too deep a draft for Dutch canals, *Lady B* waits on a barge for her trip to the sea.

## GMT gives robots a hand with carbon fiber effectors

Semiconductor manufacturers build the integrated circuits at the heart of most of today's modern electronic machines – whether those machines are computers, factory equipment or armaments. In turn, those manufacturers come to firms like Brooks Automation for custom tools to make the semiconductors.

Brooks, a long-time GMT customer, is regarded as one of the world's leading suppliers of robotic wafer-handling tools. Their robots provide high levels of tool precision and uptime, an optimized mix of throughput repeatability, and the cleanliness that semiconductor manufacturing must have.

Brooks' Razor line, the latest generation of direct-drive robotic tools, offers single- and dual-wrist articulation for 2- and 3-FOUP (Front Opening Unified Pod) trackless arms. At the end of those arms are GMT carbon fiber

"effectors," the hands that hold the silicon wafer discs as robots move them through manufacturing stages.

Semiconductors require incredibly fine precision. Carbon fiber permits very lightweight but stiff "hands" with minimal weight-load and bending moments, that can be produced and machined to the most exacting specifications.

The Brooks robots are so reliable that the company can back them with Guaranteed Up-Time Support (GUTS), promising to diagnose and coordinate response to any manufacturing downtime on their robots in 59 minutes or less. The GUTS program means that every component must meet exceptional fabrication and reliability standards

GMT also produces carbon pallets used in wafer nanotechnology (surface evaluation) before circuits are employed.



Robotic production-line wafer handling relies on GMT's carbon effectors.



# Lutine, historic club yacht, to race again

*Eager*, one of Britain's most illustrious yachts, has been relaunched after a two-year rebuild and restoration under Jeff Rutherford in Richmond, California. Originally named *Lutine*, this Camper & Nicholson 55, Hull #1, has gone back to the Solent for a second racing career, enhanced by her GMT carbon composite mast and boom.

*Lutine* was built in 1970 as the club yacht for the Lloyds Register Yacht Club and raced extensively on the circuit. Her success inspired others to commission C&N sisterships. *Lutine* was subsequently sold into the charter trade and renamed *Acclaim*.

English yachtsman Rob Gray purchased *Acclaim* and asked Jeff, who had done two previous proj-

ects for him, to make this classic yacht better than new.

Her hull was gutted and the wood deck removed. While the new interior and cockpit are more luxurious, *Eager's* external appearance appears original, except for 15 feet of added mast height for sailing performance. Jeff says, "Rob Gray likes to finish first and is willing to live with the rating consequences."

Jim Antrim, the well-known naval architect who designed *Eager's* new sailplan, recommended us to Jeff and Rob. Jim looked at several spar builders, but GMT's engineering, price and attentiveness won out. Jeff says of GMT work: "They built a beautiful spar. And I'd do another with GMT: they really respond well!"



*Eager*, originally named *Lutine* and then *Acclaim*, has been rebuilt to race again.

## SeaStairs welcomes guests aboard Hunt motoryacht

The 89-ft *Tumblehome*, a C. Raymond Hunt Associates deep-V motoryacht which was built by Lyman-Morse Boatbuilding, recently had her set of carbon stairs replaced with GMT's carbon SeaStairs.

This much-reviewed custom motoryacht came to GMT for a number of reasons. Her new staircase has one additional step, which makes the boarding angle less steep. And the staircase has four stainless steel casters, which allows the SeaStairs to float effortlessly on the dock when the yacht is berthed alongside a float or a pier and slightly shifts her position due to the action of wind or waves.

The new GMT SeaStairs, including the elegant teak treads, have a total weight of only 65 lbs, or 30% less than the shorter, narrower, carbon boarding system without casters that our SeaStairs replaced. *Tumblehome's*

First Mate expressed delight in discovering that, when the SeaStairs are folded, there is extra space between the steps which prevents fingers from getting pinched when opening or closing the stairs.



At Newport Bucket, GMT SeaStairs on *Tumblehome*, just after installation.



*Tumblehome*, before topsides re-Awlgrrippid.



# A tale of two Tartans: the *Odysseys* sail on

Thirty-six years ago, a midwest family bought a Tartan 34. They liked it so much they bought another so they could enjoy one at home in Wisconsin and the other in the Caribbean. Fast-forward a few years; they sold one Tartan to a family friend. That's where our story begins.

David Shiff, son of that first

## A new smaller PowerFurl!

GMT has created a smaller version of its PowerFurl™ boom that's more appropriate for yachts 35 to 56 feet. The smaller PowerFurls use electric-drive motors (located inside the mandrel within the boom), and their boom section is smaller. Our new model will be fitted on the first Hylas 56.

owner, inherited *Odyssey*, the now aged Tartan. To breathe new life into this classic yacht, he researched how to turn his Tartan into a more potent racer. That led to choosing a carbon fiber mast and interviews with several carbon spar builders.

He says, "GMT was the only one able to discuss my specifications and answer my questions." Unfortunately, his new GMT mast was slightly damaged during its overland delivery. So David decided to have us build another, adding a few more features and a GMT carbon boom.

David also worked diligently with paint suppliers to find a polyurethane finish that would perfectly match the appearance of aluminum so that his restored Tartan maintained the original-build look. He describes his new GMT carbon rig as "a work of art

which was built beautifully in every respect."

What about the other structurally sound and barely marred carbon mast? Call the friend who owned his family's other Tartan 34 to see if he'd be interested! That's how David Bohl came to upgrade his Tartan, also named *Odyssey*.

Both Tartan 34s have more to show for this than just beautiful GMT carbon rigs. David Shiff has won his class in every race on the Chesapeake this year, several being overall victories as well. And among David Bohl's successes is a Second in the 2010 Queens Cup against a fleet of more than 180 racers.

Thus two classic Tartan 34s have a new lease on life. Shiff regards himself as a pretty fussy buyer but said of his experience: "GMT is a delight to work with!"



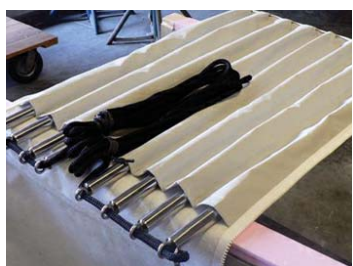
David Shiff's *Odyssey* winning again.

## 100-ft Hatteras acquires a folding GMT passerelle

What happens when you have a large motoryacht that needs a passerelle but lacks both the space for an internal launching chute and a crane for deploying a ramp? You call GMT and – *voilà!* – a 12-ft folding passerelle so lightweight one crew member can handle it.

GMT was asked by the captain of a 100-ft Hatteras motoryacht to build a carbon fiber passerelle. Its two sections fold for storage, have a 75-lb safe working load, and include anti-chafe skid strips on their underside. Folded up, the two sections weigh only 50 lbs (10 of which are 4 SS casters) and stow in just 6' x 2' x 12".

The stainless stanchions slide into streamlined slots; handrail lines snap-shackle into eyes at one end and lash at the other. Zippered pouches efficiently hold the components when they're not on duty.



Top: GMT's lightweight folding passerelle.

Middle: Stanchion detail.

Bottom: Components store efficiently.

## Hake 27-ft trailerable sailer features a 40% lighter rig

Dr. Carlos Tessi gave himself a retirement present: a GMT carbon mast for his Seaward 26 RK. It saves weight aloft, improves performance, and it's easier for him to step the mast by himself as he trailers his Hake Yacht between cruising waters.

The spar weighs only 25 lbs. Even with the original aluminum boom, the rig is 40% lighter. Carlos admitted, "I kept the aluminum boom, but I might go for carbon in the future. I'm extremely satisfied with GMT. They're great to deal with!"

Dr. Tessi recently cruised from Bristol, RI to New York in 10 days. "We had some heavy weather and 10-ft rollers when exiting Narragansett Bay, but the boat behaved beautifully. It's stiffer, stepping the mast is easier, and with Harken Battcars I can douse the main at almost any point of sail. And I have 40% less mast weight when trailering."



Carlos Tessi's *Seaward 26* sports new mast.



Dock in deployed mode, with carbon and teak ramp angled down to land.



Dock with carbon landing section retracted, ready to be pulled out with handline.

# Estate dock solves difficult zoning problem

The developer of a Long Island beachfront estate faced serious dock zoning restrictions and asked GMT for a solution. Local code allowed no more than the six pre-existing pilings. And electrical power wasn't allowed.

Using our experience building passerelles for motoryachts, GMT designed a nifty solution. The six pilings would be used to support 13-ft aluminum channels supporting two carbon fiber extensions mounted on ball-

bearing wheels. Spanning the 3-foot width is a 32-inch wide teak deck, built as a box-grid – not just for draining off water but also to allow sunlight to pass through the grid, because an environmental requirement called for 50% solar transparency to nourish marine life under the dock.

Simply pulling on a handline deploys the two roll-out sections towards the landing spot 25 feet away, at the top of the

beach. The second of these sections then tilts down to dry sand. The sections automatically lock in position to prevent becoming dislodged during higher than normal seas.

Pulling the continuous line in the opposite direction retracts the sections back to the pier's outer end.

Carbon fiber's stiffness creates a stiff and sturdy walkway. The silver metallic polyurethane paint matches the powder-coat

finish of the other aluminum parts of this dock, and will be even more durable. Even with nearly zero-maintenance, it should last for years despite the harsh saltwater environment.

Excluding the channels, the entire dock weighs just 200 lbs, 75% of which is the teak. The result is a handsome and easy-to-use system with a low environmental impact which successfully adheres to extreme zoning restrictions.



Hoi An moored in a place of honor at the Royal Bermuda Yacht Club, after her podium finish in the 2010 Bermuda Race.



Polishing off the final miles to the finish.

# Newport-Bermuda 2010: "Hoi An had a great race!"

The 2010 Newport-Bermuda Race is history, but several GMT customers sent us stories of their battles with light winds, strange squalls, and luck (or not) finding good eddies in the Gulf Stream.

Bob Stephens, of Stephens, Waring & White Yacht Design, raced on *Hoi An*, a graceful yacht he designed for owner Marc Heilner. It was beautifully built at Brooklin Boat Yard in Maine.

Bob reported to us: "We saw all manner of weather, from delightful beating in 15 knots of wind and a flat sea the first balmy night, to frustrating calms, to slamming along

south of the Gulf Stream in 5'- 8' seas and 25 - 35 knots of wind. The boat performed beautifully, handling even the occasional drop into a 10' hole on the back side of a 7' sea without a creak, and her rig was equally solid and trouble-free."

"This adventure was quite different from *Hoi An's* everyday sailing experience in Maine. Her native habitat is the sheltered waters of Penobscot Bay and Blue Hill Bay, where she's seen daysailing and racing in the Spirit of Tradition classes of classic yacht races like the Eggemoggin Reach Regatta.

*Hoi An* seemed to enjoy every minute of it, although it's easy to see why boats designed for offshore tend to have a higher freeboard!"

In addition, Bob also told us that, "We knew we'd done pretty well when we arrived at the Royal Bermuda Yacht Club and saw the docks only about one-quarter filled, and mostly with big boats and Open 40's! While word on the street is that this was a light air race, we saw more than our share of close-reaching in 25-30 knots of breeze. This, in combination with catching the right eddies,

really helped our standings: 3rd in Gibbs Hill division, and 4th overall in fleet in ORR."

## Wait, there's more...

The Bermuda Ocean Cruising Yacht Trophy was awarded to Chris Culver, owner and skipper of the GMT-rigged Hinckley 59 Cetecea. This trophy recognizes the best combined performance in the 2009 Marion-Bermuda and 2010 Newport-Bermuda Races for amateur crews in monohulls.



# Electronics arch is tight squeeze, perfect fit

The 140 foot luxury motoryacht *Calliope*, launched this summer by Holland Jachtbouw (Zaandam, Holland), was fitted with a 12-leg GMT carbon composite electronics arch for delivery to the builder.

Langan Design Associates (Newport, RI) designed this eye-catching superyacht. The latest navigation and communications gear were required; carbon construction was called for, allowing Langan more latitude in design and turning the carbon arch into a signature element.

Using carbon removed nearly 600 kg (over 1300 lbs), improving stability, eliminating the need to add ballast, reducing displacement, and increasing fuel efficiency. A carbon composite structure resists and dampens vibration, improving electronics performance and lifespan.

Because the arch needed to ship from the US to Holland protected against scrapes and dings, great care, including CAD motion simulation, was used to fit the arch inside a standard shipping container. There were only 3 millimeters (1/8") to spare on each side and, even with progressive angling of the arch unit to fit through the doors, only a tiny bit more clearance over the top.

Building height was insufficient to install the arch so it was painted and rigged with electronics separately. The thin walls of the 12 legs provide plenty of room for concealing wiring and the removable ceiling provides access to mounting points and junction connections.

The critical moment: installation. The arch was hoisted by crane over the launched vessel. When lowered in place it fit perfectly, with nearly invisible joints.



*Calliope's electronics arch awaits installation.*



*Top: Installation. Bottom: Calliope and her arch.*



*GMT carbon spreaders with faux bois finish.*

## Carbon composite spreaders save weight aloft

Replacing an aluminum mast with a carbon spar saves a lot of weight high above the water where it dramatically affects a sailboat's heeling moment. But there are partial methods to take weight out of your rig, one of which is by replacing metal or

wood spreaders with carbon fiber. GMT spreaders can be engineered for whatever strength, shape or dimensions you require. Fittings such as lights, flag halyards, and electronics mounts can be faired into the spreaders to reduce windage and enhance the

appearance of your rig. Because GMT carbon fiber products are finished using polyurethane paint, we can match virtually any color of spar, including the metallic gray of aluminum. And our faux bois finish lets us make carbon appear to be wood.



*Carbon fiber composite parts and structures for industrial, scientific, military, medical and marine applications worldwide.*

### GMT Composites

48 Ballou Boulevard  
Bristol, RI 02809 USA  
telephone: 401 253.8802  
fax: 401 253.9395

info@gmtcomposites.com  
www.gmtcomposites.com

## J/30 combo sprit

A New England sailor wanted to spruce up his J/30 by adding an asymmetric spinnaker. But he didn't want to abandon being able to use his standard spinnaker when racing. He asked if we could combine both spinnaker tasks in a single pole. With some GMT engineering we produced his new pole.

It's deck mountable for use when he's flying the asymmetric and is quickly and easily detached to clip to the mast track for setting the standard chute. Because we're looking into patentability, we aren't showing a picture.



*Female mold for lay-up of streamlined carbon fairings for US Navy vessels' sensors.*

## Fairings protect Navy sensors

GMT is building prototype fairings for the US Navy. These will be installed on the bottom of two ships to assist in protecting high-tech gear. Because carbon fiber is radio-lucent, underwater trans-

mission of electronic signals and beams is not distorted when passing through these fairings. GMT looks forward to additional orders when sea trials have been completed and analyzed.