SOLUTIONS FOR TODAY'S SAILORS

FARR® 40 ONE-DESIGN

TUNING GUIDE

NORTH SAILS

Farr 40 *Tuning Guide*

The Farr 40 One-Design is a modern Grand Prix-type yacht designed specifically for the fun-loving owner-driver. A highly competitive Offshore One-Design, it was designed to be compatible with the IMS rule. The boat has lighter displacement, higher stability and more sail area than the typical IMS boat, although Farr International has made no concession to the current trend to better one's rating at the expense of speed. The result is a fast, safe, fun boat that guarantees enjoyment on the water.

Chosen as SAILING WORLD magazine's Boat of the Year for 1998, the Farr 40 One-Design has captured honors and taken home the silver at such prestigious events as the Gold Cup, Key West Race Week, SORC, Block Island Race Week and the NYYC IMS Nationals.

The Farr 40 One-Design tuning guide is the latest addition to our expanding library of tuning guides. Others available include the Mumm 30, J/105, J/35 and J/120. All North Sails tuning guides are designed to help you get up to speed...*FAST!* (We call it "*turnkey speed.*") Included are all the references you need for setting-up the Farr 40 One-Design for maximum performance, with photos of sails taken from "the trimmers view" to help you replicate fast settings. 3DL™ sails are featured almost exclusively in upwind sails, both for weight savings and use over a wider wind range. Comments on sail trim, and tips on boat handling are written as if your North Sails representative were sailing with you.

If you currently own a Farr 40 One-Design, you may have some of your own go-fast tips to add to this guide. We'd love to hear from you. If you are new to sailing the Farr 40 One-Design, we'd also appreciate your comments and feedback.

We wish you good sailing. *Sail Fast! Sail Smart!*

Tom Whidden, CEO, North Marine Group

Contents

Our thanks to Bruce Farr & Associates and to Farr International who graciously provided many drawings and data, our Test Team of (standing left to right) John Thompson, North Sails designer; Will Keyworth, North Sails Chesapeake; Greg Sloat, captain of PREDATOR; Tom Weaver of Farr International, Peter Houghton (kneeling), captain of FLYER, Andreas Josenhans (not shown), North Sails PRG, Tuning Guide author and photographer; and to Andrea Trimble and Debbie Springer for assembling this manual.

NOTE: This tuning guide does not supercede Class, ORC, or US SAILING rules.

Farr 40 Tuning Guide

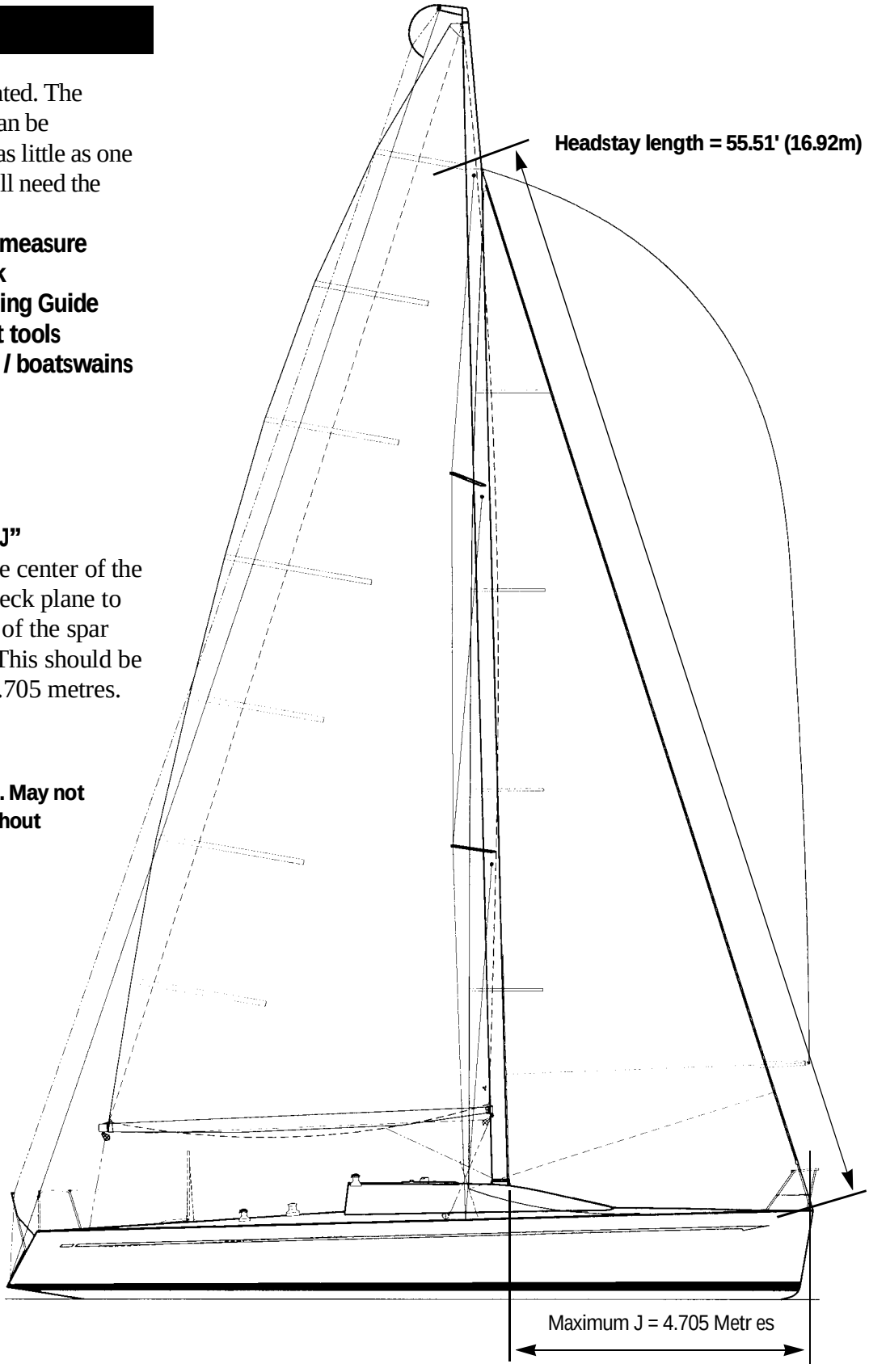
SET-UP

Don't be intimidated. The following steps can be accomplished in as little as one hour's time. You'll need the following:

- **30 metre tape measure**
- **WetNotes book**
- **North Sails Tuning Guide**
- **Rig adjustment tools**
- **Safety harness / boatswains chair**
- **A crew of six**

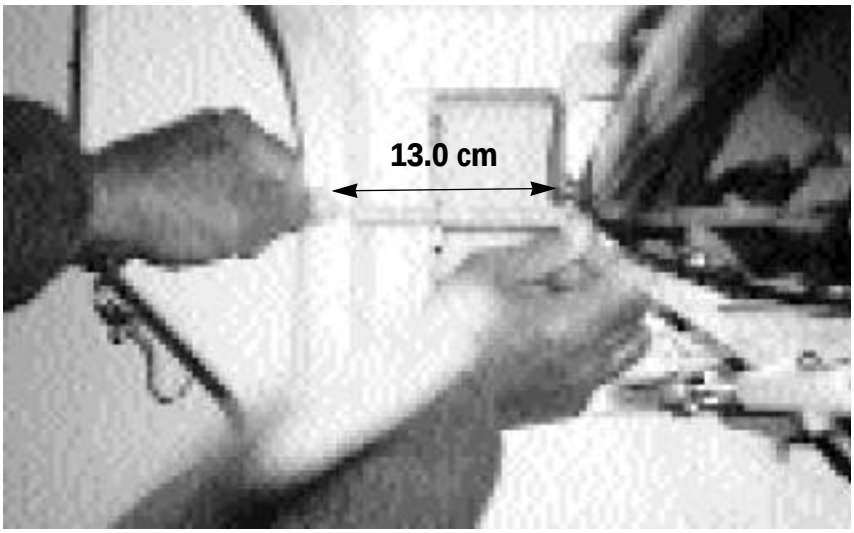
Step #1 - Max "J"

Measure from the center of the headstay at the deck plane to the forward face of the spar above the deck. This should be a maximum of 4.705 metres.

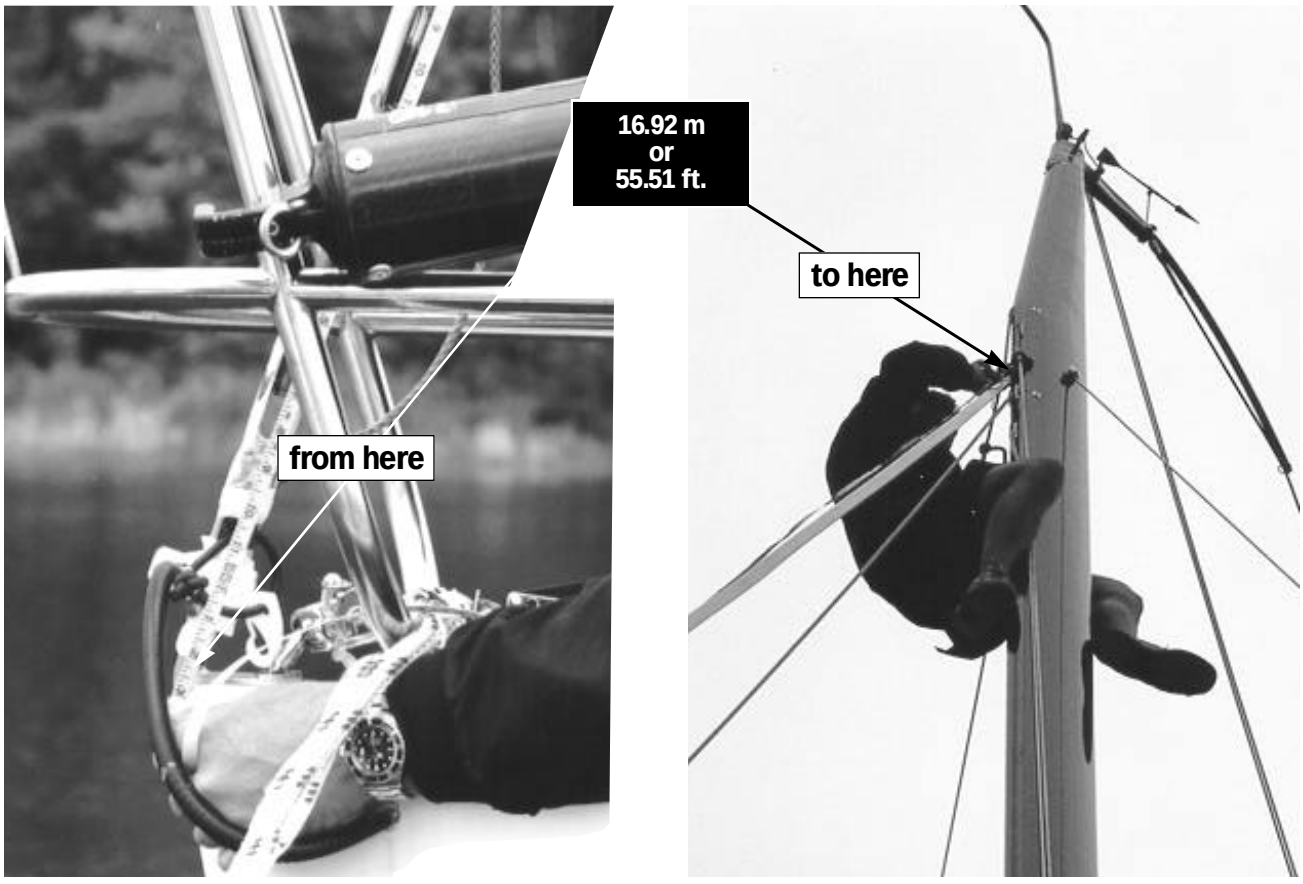


SET-UP

Step #2 - Butt Position
The forward edge of the spar should be 13.0 cm behind the bulkhead. Please do not measure to the aluminum brick. Measure the shortest distance to the forward face of the spar.

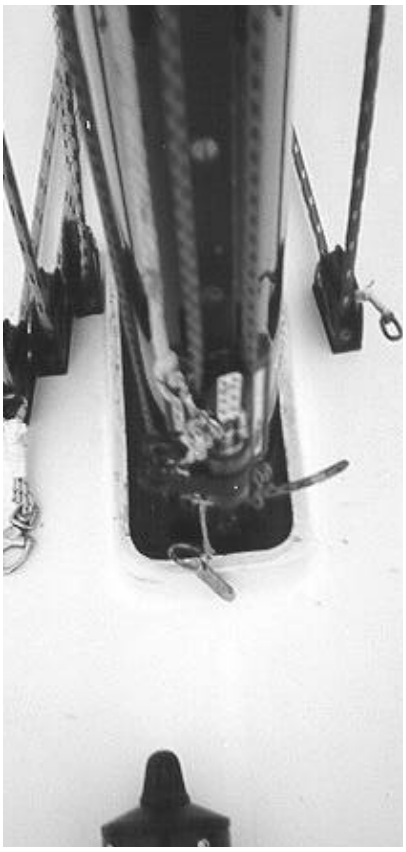


Step #3 - Headstay Length
With spar stepped, set the headstay length to 55' 6 ¼" (16.92 m or 55.51'). Measurement is taken with the rig stepped. The measurement is taken from the intersect of the headstay at the stem/shear to the top of the headstay, on the center-line and on the forward face of the spar. This measurement should be taken with 2,000 psi of headstay tension.



SET-UP

Step #4 - The Reference Arc (see photo at left.)
From the top of the white band at the gooseneck, measure 1 metre down and paint a 2.5 cm wide white line. From this line (which you marked on the spar) swing the centerline halyard to the headstay and make an indelible mark. With the headstay length of 16.92 m there should be a distance of 1.44 m (4.72') to the center of the load pin. This is baseline. Baseline jackstay pressure is 3500 psi. From this line swing a halyard to the headstay and mark the headstay. This 1.44 m distance is from the mark on the headstay to the center of the load pin. 1.44 m is the baseline setting for headstay length.



Step #5 - Centering the Hounds & Partners
With jackstay pressure of less than 4000 psi, but more than 2000 psi, measure and locate the center of the spar at the hounds (see photo left). Measure to the center of the shroud pins at the chainplates. Then move the spar either direction. A 2cm difference can be corrected with roughly six 360˚ turns. Check to be certain the spar is equidistant from both chainplates. On some boats the partner hole was 2cm off to starboard.

NOTE: *Position the middle of the spar in the partner hole so that it is exactly in the middle. The middle is found by measuring from the center of the upper starboard to upper port.*

Step #6 - Jack the Spar Up to Nominal Pressure
The spar should be ready for maximum jackstay pressure. With the diagonals loose, the jackstay pressure should come up to 2500 psi. Then add tension to the diagonals roughly 4 turns on the D1s and 5 turns on the D2s. Total jackstay pressure with the headstay at 16.92 (or 1.44 reference arc) is 3500 psi.

SET-UP

Step #7 - Jib Leech Trim Marks
Mark spreaders port & starboard with white tape parallel to centerline. From sail groove to back face of spreader distance should be:

S1: 3' 8 ½" (1.28 m)
S2: 2' 4" (0.71 m)

Step #8 - Go Sailing in 10+, But Less Than 20 Knots
The boat should be in racing trim with a headsail and mainsail fully trimmed and the crew hiking.

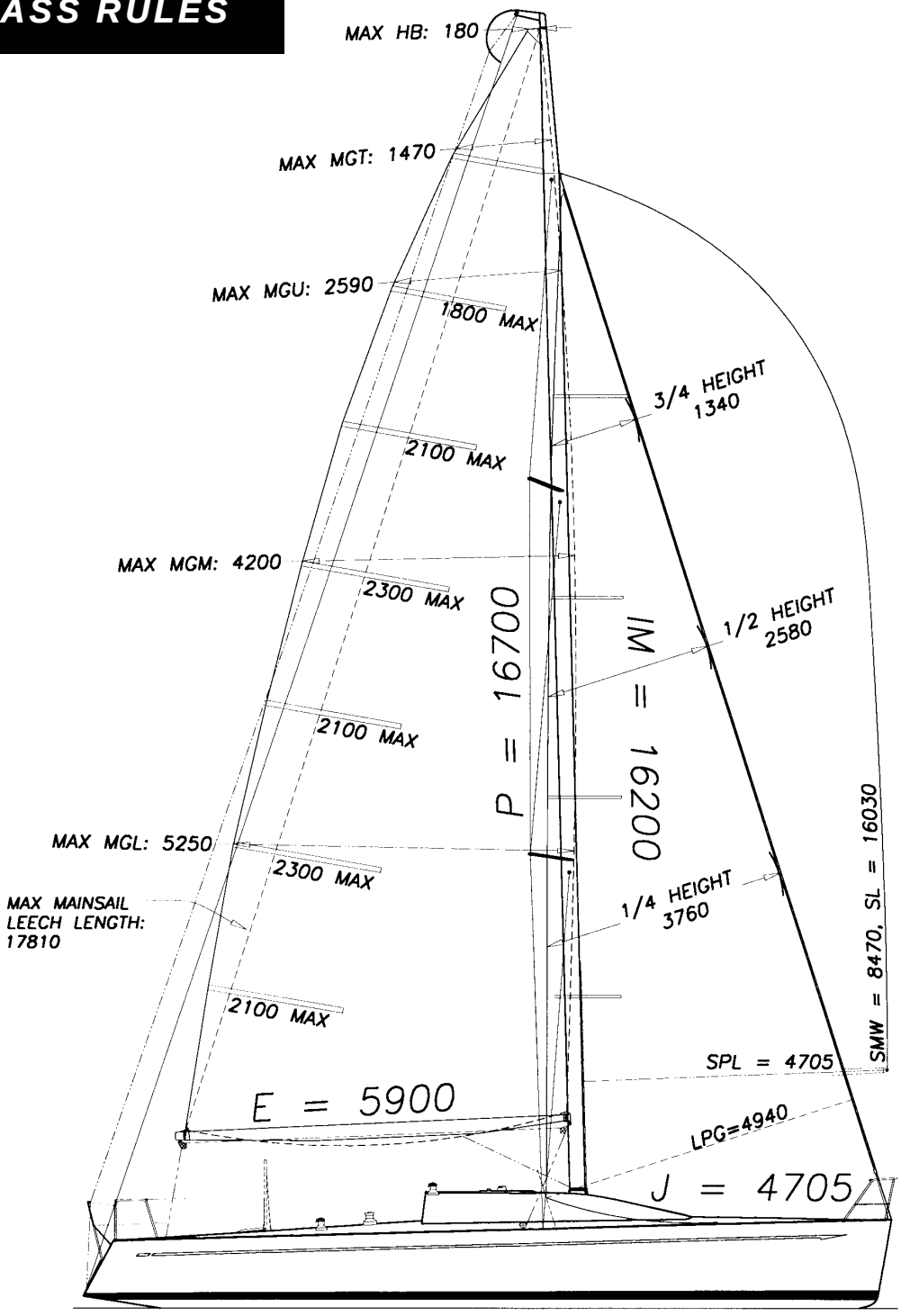
To finish the spar tune sight up the sail groove from the aft face with the boat in racing trim (see right). This allows the rig to be seated under the same pressure as found while racing. Adjust tension on the D1s and D2s until the rig is straight sideways. If you sail in very heavy or very light air you may want to tune the rig thwartship for your most common condition.

Rig & Tuning for Winds from 0-20

	Headstay	Jack	Lowers
Medium Dock Setting	16.92 m	3500 psi	+4 turns (hand tight)
Light (0-7)	-5 turns Main will overbend at 4500 on headstay	3200 psi	-2 turns (floppy)
Medium (7-11)	+5 turns Main will overbend at 5500 on headstay	3500 psi	+2 turns (snug)
Med/Hvy (11-16)	+2 turns Main will overbend at 7000 on headstay	3800 psi	+1 turn (tight)
Heavy (17+)	+3 turns Main will overbend at 7500 on headstay	4000 psi	+2 turns
Heavy Dock Setting	16.813 (shortest)	4200 psi	stay at +3

Latest regatta reports show yachts to be winning in 6-13 knots with reference arc of 1.44 m, butt 13.0 cm & jackstay pressure at 3900 psi. This works best with the light jib designed as of July '98 (06/08/98 design date).

CLASS RULES



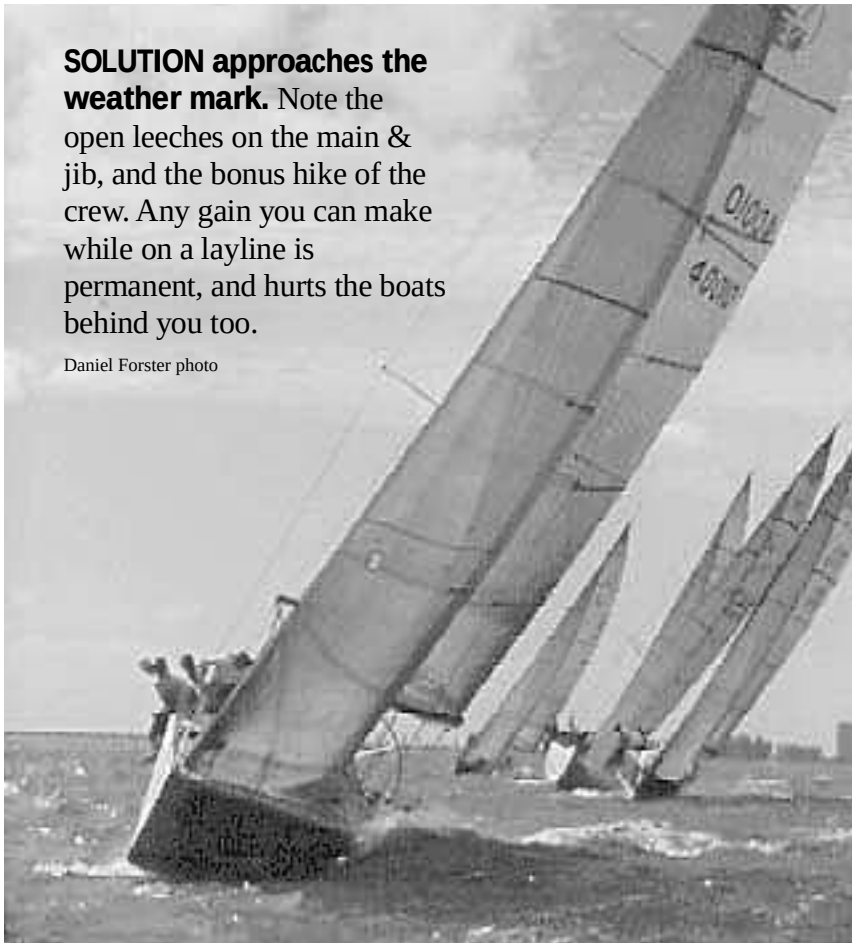
BRUCE FARR® AND ASSOC., INC.	P.O. BOX 4864 ANNAPOLIS, MD. 21403, U.S.A.
FOR- FARR 40 ONE DESIGN CARROLL MARINE LTD	
TITLE MEASUREMENT SAILPLAN	DESIGN No. 374
	COPYRIGHT AUGUST 14, 1997 © BRUCE FARR & ASSOC., INC.
DRAWN: SM	DRAWING No. 24A

REV A, 8/26/97 MAINSAIL BATTEN LENGTHS INCREASED

SAILING THE BOAT

◀ SOLUTION (left) on starboard tack in 15 knots true. Note the hiking efforts of the crew, the trimmer's attentiveness to boatspeed, heel angle, behaviour through the waves, and the luff tension on the 3DL headsail. The goal is to keep the boat at target speed regardless of sea state.

Daniel Forster photo



SOLUTION approaches the weather mark. Note the open leeches on the main & jib, and the bonus hike of the crew. Any gain you can make while on a layline is permanent, and hurts the boats behind you too.

Daniel Forster photo

SOLUTION (above) cleans up after rounding the weather mark. Keep your energies focused! Let the driver drive, the trimmer trim, etc. to get the boat back to maximum speed. When sailing in waves always try to sail downhill.

Daniel Forster photo

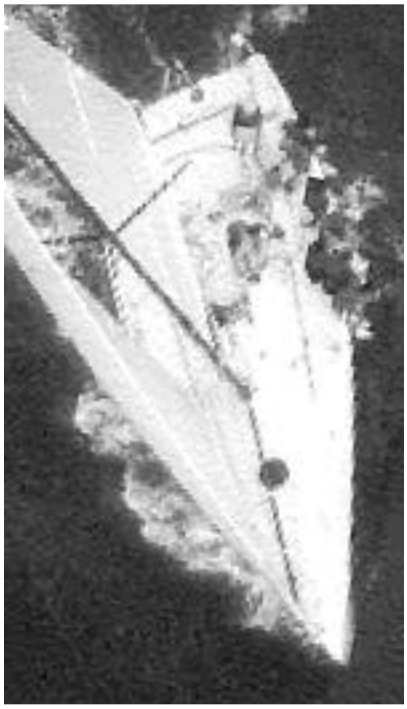
SAILING THE BOAT

HISSAR (right) powers upwind with Mike Toppa trimming main. Mike is trimming to maintain target speed without overheeling the boat. He has the mainsheet uncleated in hand and the other hand on the winch handle. When a group of big waves is two lengths away he eases the main 3" to start the speed build with only 2˚ extra heel. Immediately after the big waves, Mike trims the main to get the boat to maximum VMG. He is also scanning the sail shape of both sails occasionally to look for things he can do to go faster/higher. The 3DL sails are translucent so he can see right through the main to see the headsail set-up. The helmsman and trimmer are steering the boat together— one adds or subtracts weather helm with the sails while the other finishes off the upwind speed balancing act with the wheel. This whole trim loop is done with a very quiet verbal description: "Two waves... easing...speed is building...trimming on. OK, let's burn a little speed...OK, back to target." Daniel Forster photo

PHOENIX (left) shows excellent speed in a seaway. Everyone's hiking hard. The main is eased 3" and the bow is down. No doubt the main trimmer is assisting the driver "You have two-tenths more to build...you're there now...GOOD JOB!" Peter McGowan photo

A port tacker (left) crosses behind another F-40. Note boom position and traveller in the 10-knot breeze, and depth of mainsail foot. It is possible the headsail could be barberhauled in a bit. The base tracks are at 11˚ and the edge of the doghouse at 8˚. The jib could be trimmed closer. If the boat is at target and holding speed, the barberhauler will ad pointing. Pull it in until it is hard to hold speed or accelerate. Peter McGowan photo

SAILING THE BOAT



SOLUTION powers upwind in 1997 Gold Cup in Fort Lauderdale. Note:

- Hiking — crew weight concentrated in middle to minimize pitching in a seaway
- Trimmer in cockpit for quick adjustments
- Traveller & boom positions
- Lack of barberhauler

Daniel Forster photo

OUI FLING flies downwind (left) with spinnaker luff setting vertically off the pole. The crew is nice and low to minimize rolling and pitching. The foredeck is cleaned up and ready for any headsail. While it can't be seen in the photo, the spinnaker curl is restricted to the area above the top joining seam, which is good. Too much curl eliminates useable sail area. Bow and mast men should be looking aft, ready for any instruction from the tactician. Peter McGowan photo

FLYER (left) rounds the weather mark but needs to settle down as soon as possible. Get everyone seated, focused on their jobs with no idle chatter. This lowering of the center of gravity and increased concentration will, in turn, allow the kite to be eased and be faster. This boat is carrying approximately 12˚ heel. If you need heel in moderate air try small amounts of weather heel. The weather heel allows the sail to project to windward and expose more driving area. A secondary gain will be that the spinnaker luff will fly vertically and carry a nicer curl. Peter McGowan photo

SAIL SHAPE

Following is a sample digitization of WIRED's mainsail. Using North's proprietary SailScan program, we can determine the depth of the sail, the twist, the leading and trailing edge shapes, the depth and curvature progressions, all in North Sails "designer speak".

```
SAIL SCAN v1.24 06-12-97 : FILE = F40MAIN.JPG

Line front-% draft   camber  back-%  lead-%  trail-% twisting
 0: 0.7480  0.4600  9.2194  0.7051  0.3585  0.2520   0.0000
 1: 0.7286  0.4699 12.3898  0.7279  0.4533  0.3523  -2.8672
 2: 0.7628  0.4099 11.8075  0.7489  0.5211  0.3383  -2.1701
Line Luff  1/8   2/8   3/8   4/8   5/8   6/8   7/8   Leech
 0:  1.042 1.083 1.107 1.078 1.000 0.770 0.511 0.286 0.103
 1:  0.780 0.858 0.961 1.011 1.000 0.789 0.543 0.340 0.184
 2:  2.176 2.364 2.228 1.707 1.000 0.880 0.809 0.740 0.680
 0:  0.107 0.111 0.114 0.111 0.103 0.079 0.052 0.029 0.010
 1:  0.253 0.278 0.312 0.328 0.324 0.256 0.176 0.110 0.059
 2:  0.953 1.035 0.976 0.747 0.437 0.385 0.354 0.324 0.297

Boat Name:  Farr 40 "Wired"          True Wind Speed:   8
Date:       June 97                  Checkstay Tension:
Main Code:  M1                       Backstay Tension:
Notes: Fast set-up for light air
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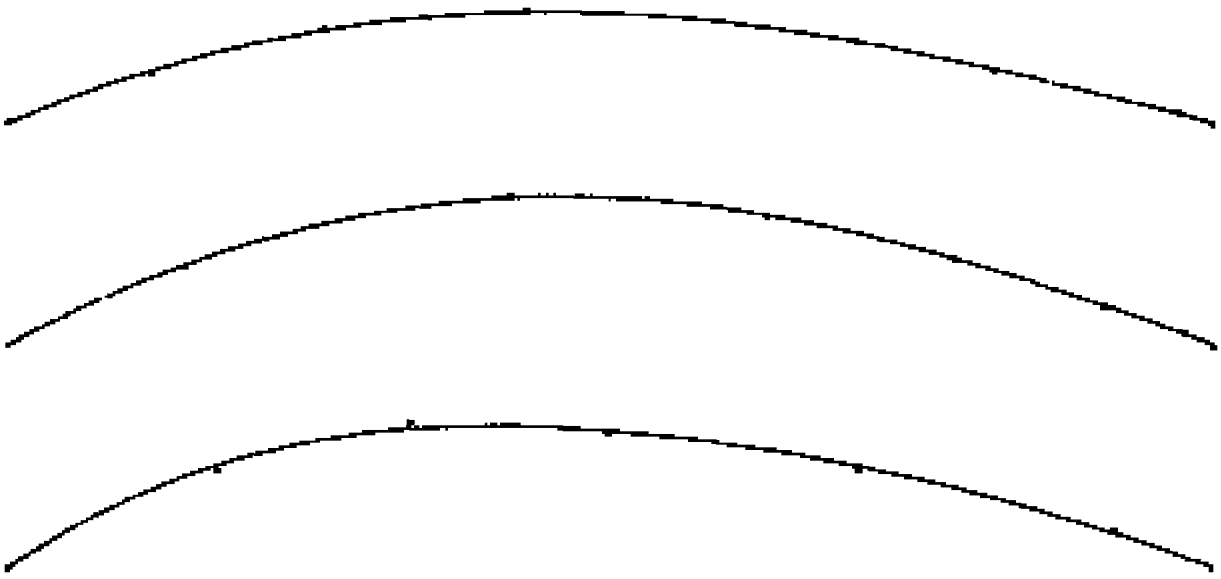
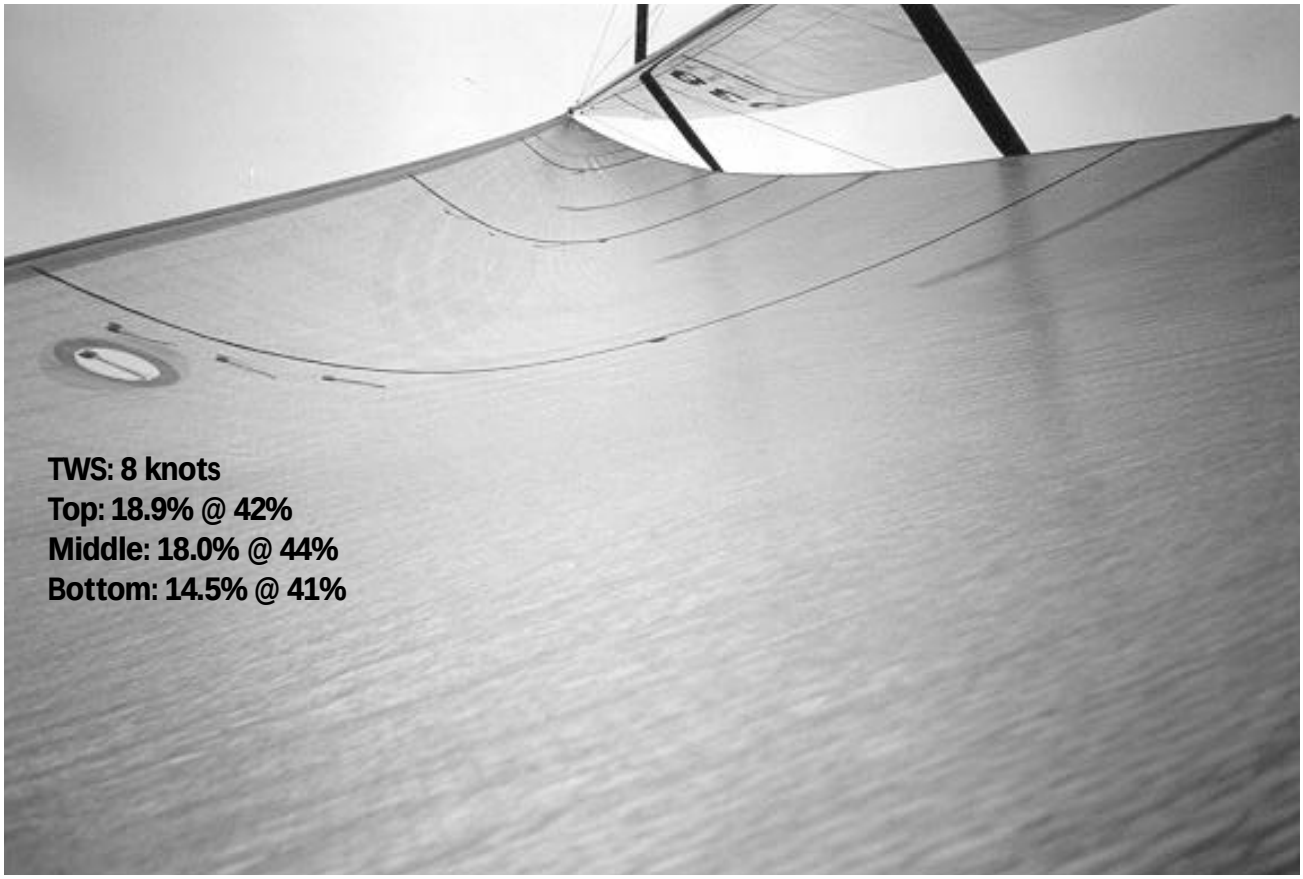


LIGHT JIB SHAPE

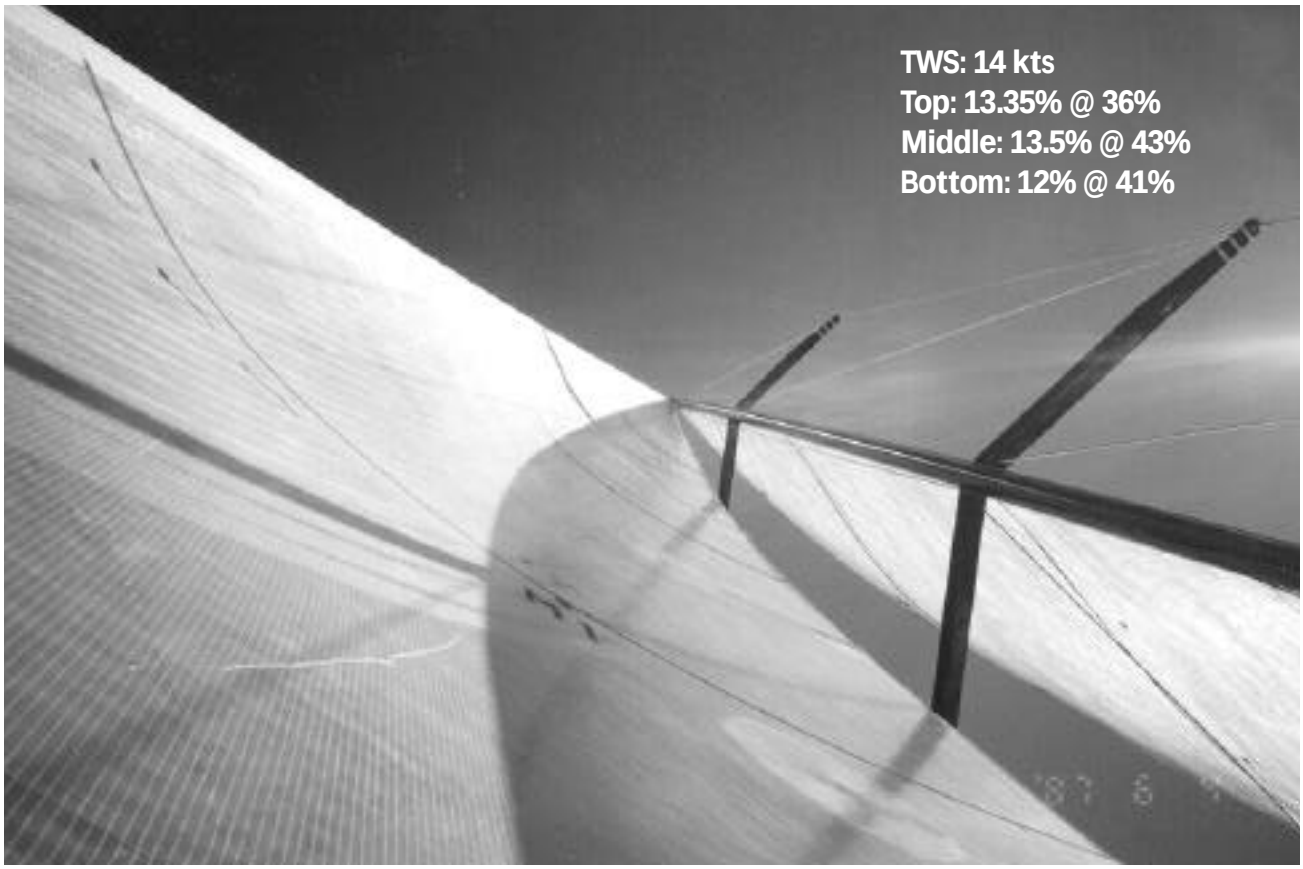


This 16800 DPI 3DL Grand Prix sail is designed to absolute maximum size. It's optimal range is, in part, controlled by the high performance characterstic of the Farr 40 One-Design. The optimum range is from 0-7 knots true windspeed.

Shown in 8 knots true, the sail is at the very upper end of it's aerodynamic optimum operating range. The construction of the sail will allow apparent windspeeds up to 16. Therefore there is no risk of damaging the sail, but you will slow down if the sail is used beyond it's range.

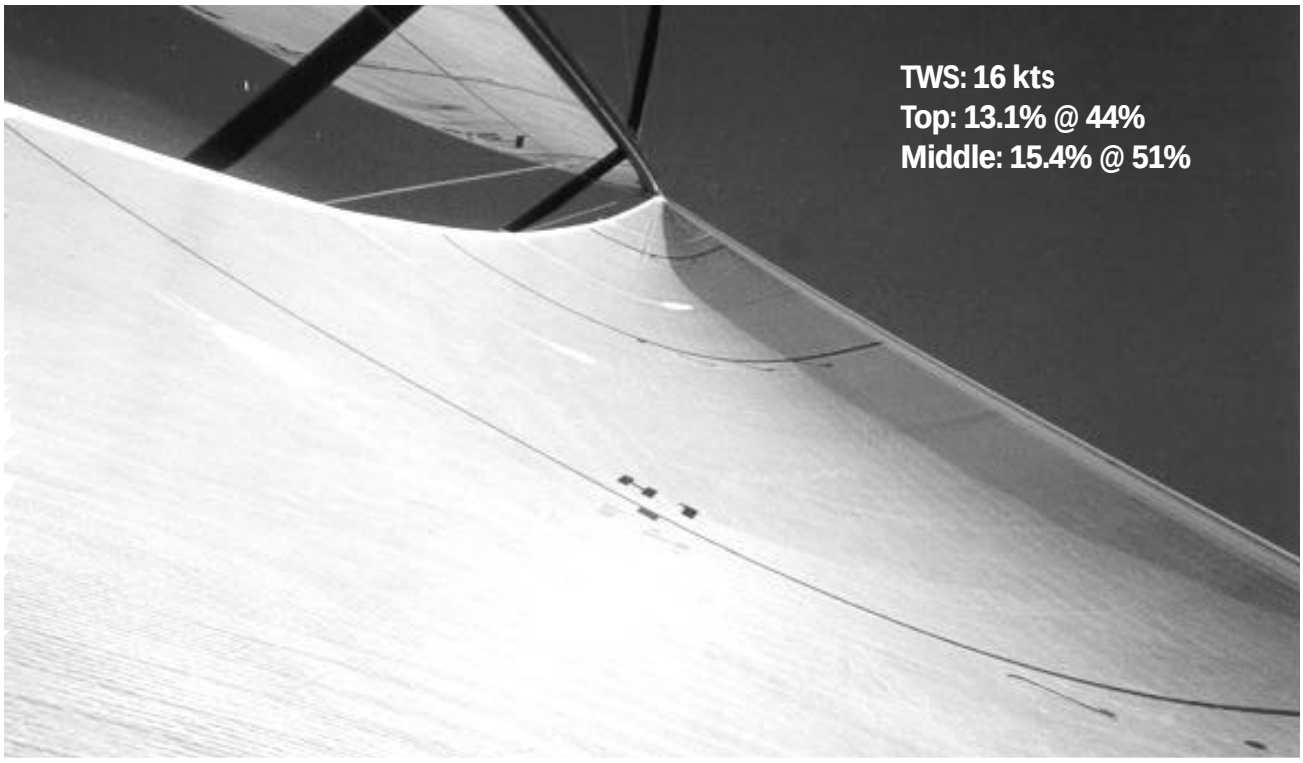
NOTE: In the following sail photos depth is listed as a percent of cord length. Draft position is measured as a percent of cord length from the front of the sail.

MEDIUM JIB SHAPE

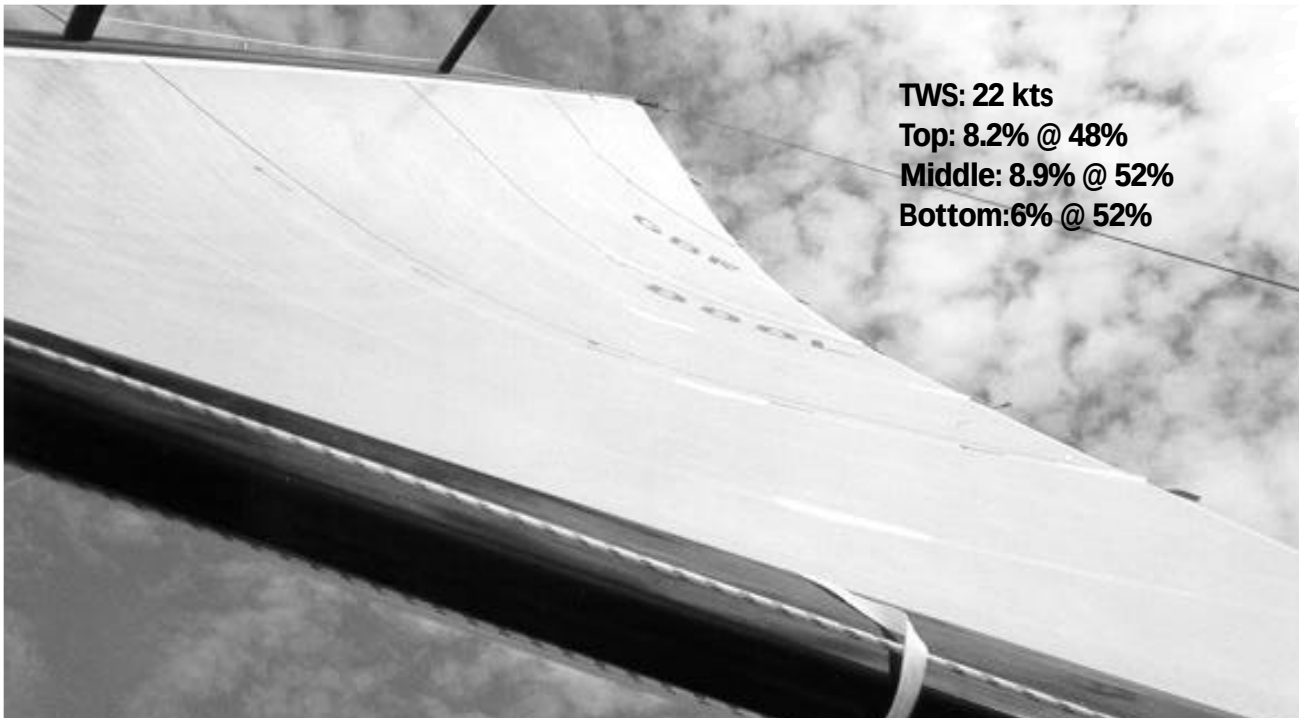


WIRED's medium jib is trimmed as hard as possible with the halyard tension just sufficient to tension the luff group yarns. The sail is set up for maximum pointing in flat water.

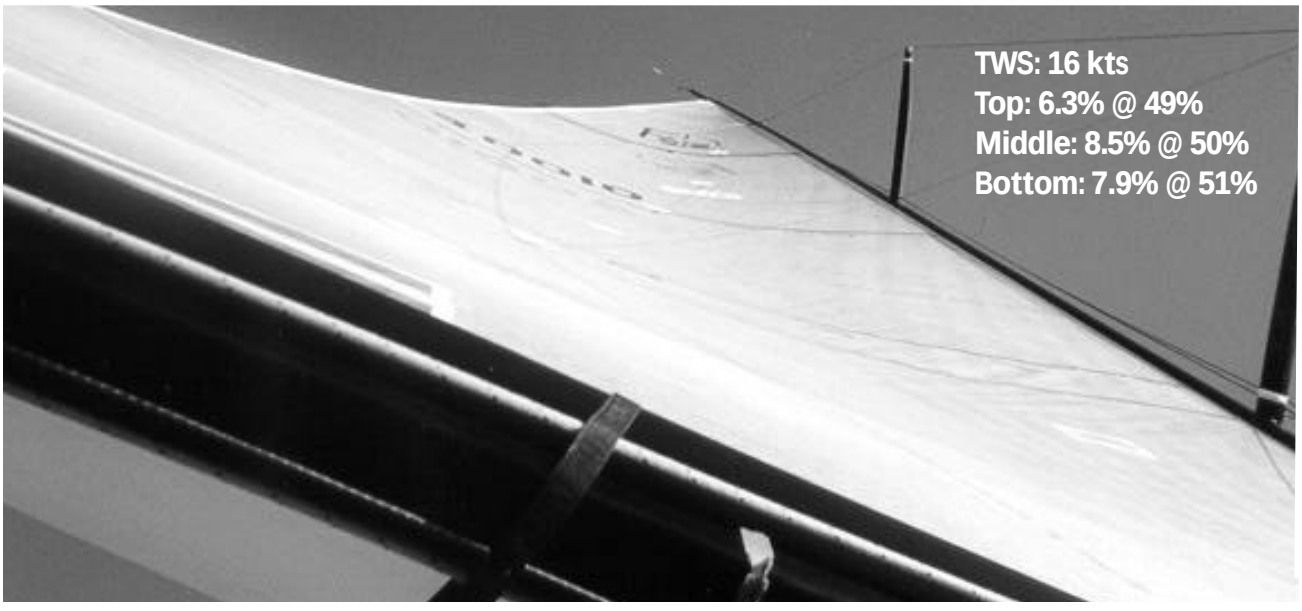
HEAVY JIB SHAPE



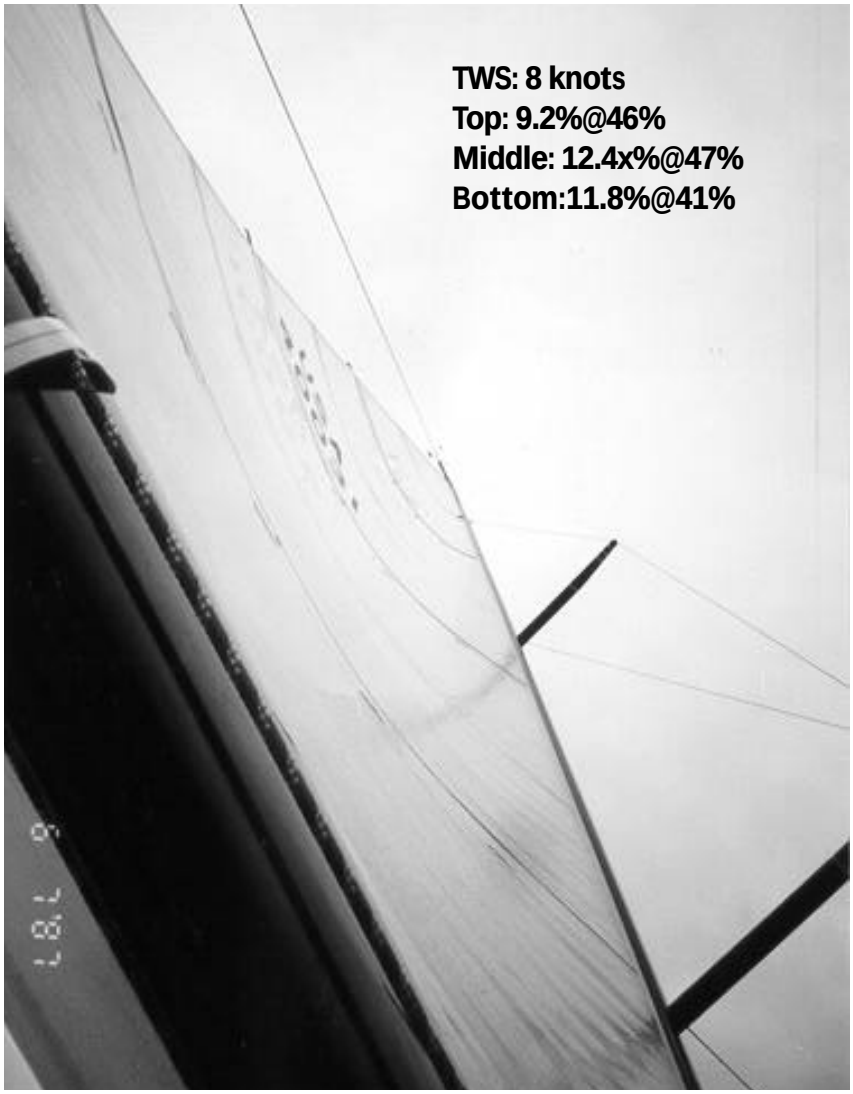
MAINSAIL SHAPES



OUI FLING's main (above) shows the effect of the tighter lower shrouds. They restrict the low bend and transfer the bend to higher up. The result is a flatter upper half of the sail, which also twists very nicely. The top batten is open 8-10˚ which helps keep the boat on it's feet and makes it possible to sail a wide groove. The widest possible groove is crucial when sailing in overpowered conditions in an ocean wave.



MAINSAIL SHAPES



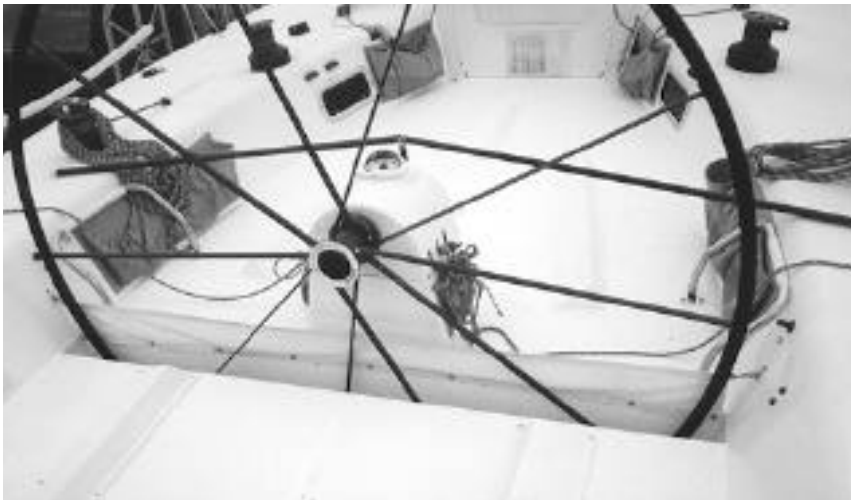
WIRED's main (left) is set up in 8 kts for maximum pointing. The top is closed by 3˚. This is great for maximum height and helm, but makes a speed build difficult. The set-up will work best in flat water with the boat up to it's target speed. If you are set up like this, be ready to crack the sheet 2" for a speed build. The top batten is a tapered model which should be replaced with an untapered one. The effect on the draft location is to move it forward 5-7% of it's designed optimum location.

NOTE: *US Sailing mandates a 10% mainsail reef for sailing sanctioned Category 0-3 events (Rule 4.24F). Farr 40 class rules do NOT require a mainsail reef (although reefs are permitted) for class events. Hovever, if your main has no reef, Farr 40 class rules require a proper storm trysail to be aboard. Mimimum main-sail weight remains at 21 kg.*

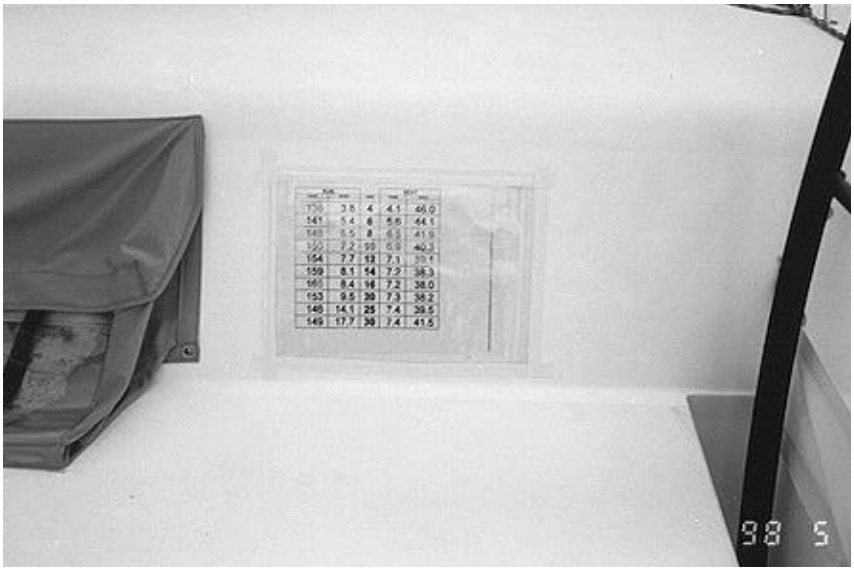
◄ **Contrast the sail above with that o**f HI**SSAR,** shown at the bottom of the previous page. That sail is trimmed with the top batten parallel to the boom. The vang is pulled moderately hard to develop an even bend and make the entry angle an even progression from bottom to top. The sail looks perfect!

The boat is up to target and this trim allows an easy speed build without a loss of pointing ability. The maximum draft is in the middle all the way up. The top is just a bit flatter than the bottom, which is okay in 16 knots on the Farr 40.

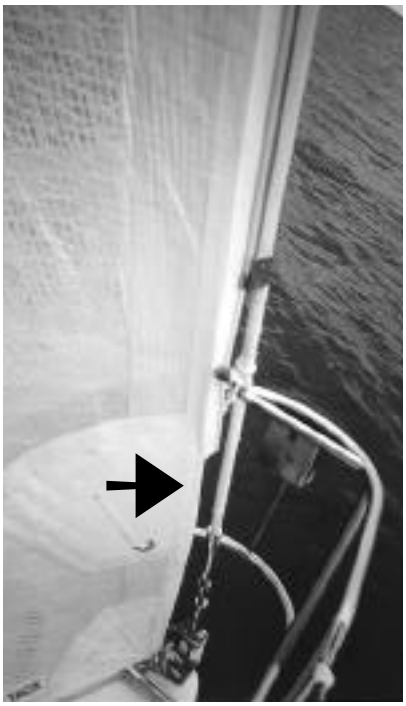
THINGS YOU WON'T FIND IN THE OWNER'S MANUAL



Install a hydraulic pumping handle — possibly one for port and one for starboard as shown above. This will keep the main trimmer to windward. To avoid becoming "Phish food" make sure the pump handles cannot get caught in the spokes of the wheel.



Post printed targets on deck. This allows quick reference for optimal speed when the wind is fluctuating rapidly. Knowing how fast you're able to go in the puffs and lulls is crucial.

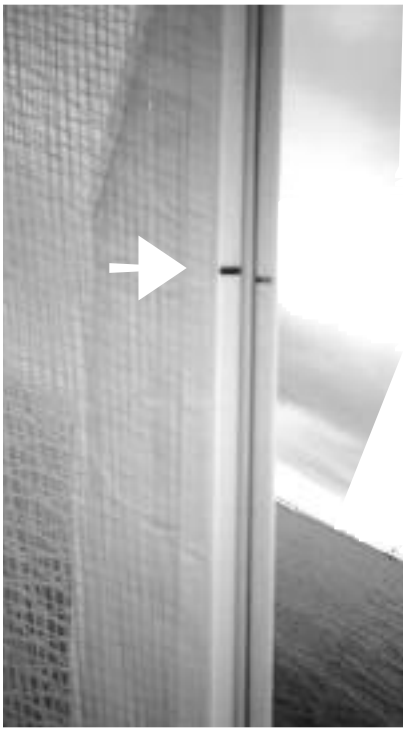


Cut away the luff tape below the headsail prefeeder by cutting up behind the primary rope. Then finish the cut away from the sail. This procedure is best done at the dock.

Mark the propeller to see when blades are aligned.

THINGS YOU WON'T FIND IN THE OWNER'S MANUAL

Tape a batten with incremental marks on it (above) to the backstay cylinder to allow duplication of fast settings. Typically this allows you to have the same fast settings out of the leeward mark as you had prior to the weather mark...if you remember where the cylinder was!



Mark the headstay 6 feet above the deck.
Your headsails should be marked when they are fully hoisted with a corresponding mark. The key when marking the headsails is to have the rake matched to the windspeed with the right sail up.

More things...

Install quick release valves near the mainsail trimmer on port and starboard.

Add spring power to the spinnaker pole end. Typically an additional ½ inch spring will make the action more positive.

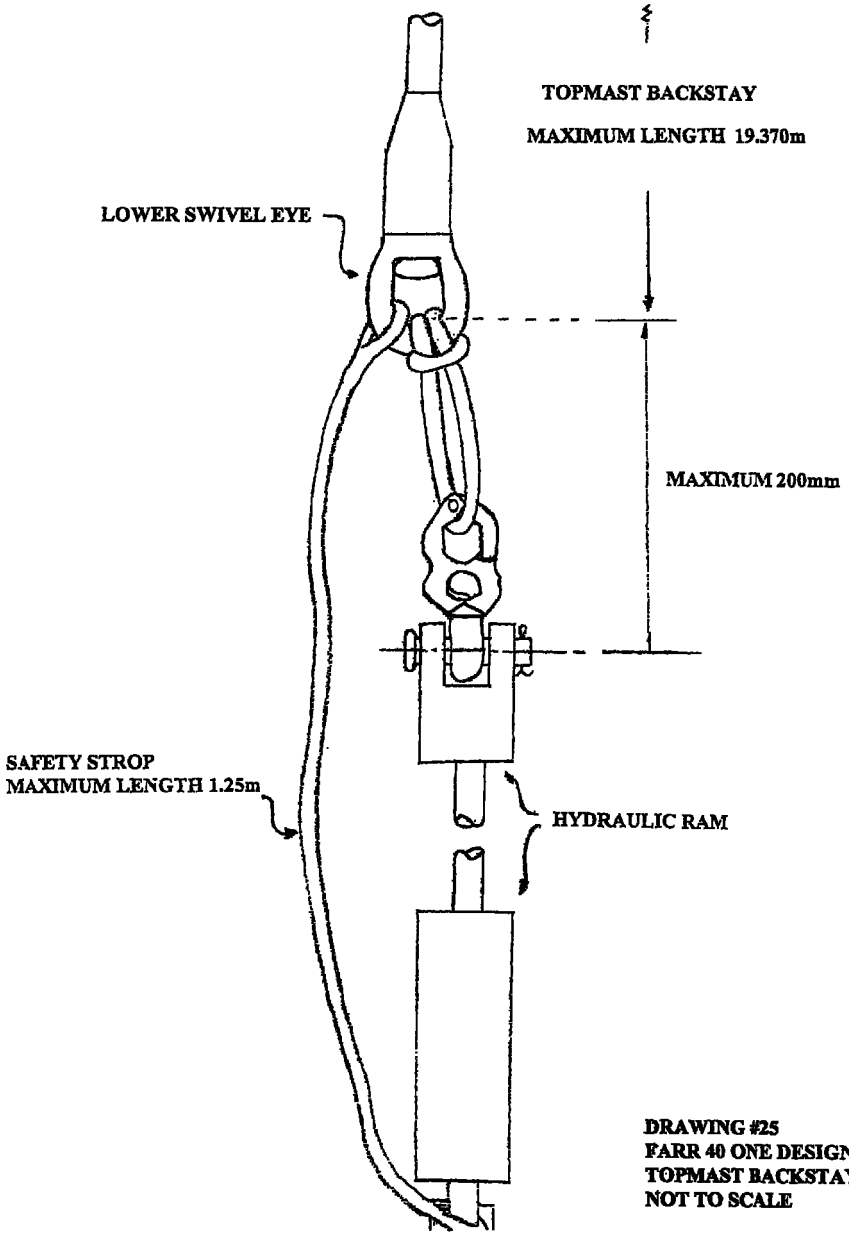
Purchase the optional topping lift. This allows the headsails to be on the centerline halyard, avoiding the distortion at the head.

Mark the wheel for center and 3˚ on either side.

Rig a forward spinnaker changing strop. This ⅜" Spectra line is run through the top inside of the headstay turnbuckle. This allows the headstay to be adjusted without twisting the strop.

Paint a mark 1 metre below the top of the gooseneck band. This becomes a reference mark. Note the headstay can sometimes slide up or down, which moves the forward mark. This allows a quick check.

BACKSTAY MANAGEMENT



DRAWING #25
FARR 40 ONE DESIGN RULE
TOPMAST BACKSTAY STROP
NOT TO SCALE

Get the backstay clear of the top batten.

A bicycle pump works wonders when you want to add air to the backstay cylinder. In turn, this lets you ease the backstay quickly.

The Carbon Fiber flicker works well to help pull the backstay away from the leech of the main.

This drawing shows the class legal means of disconnecting the backstay for running and light air.

If the backstay should snag the extra large mainsail roach, pull the vang hard to clear the backstay and pop the main on the new tack.

Farr 40 *Tuning Guide*

UPWIND TARGETS *Simplified targets courtesy of Farr International*

True Wind Speed	Boat Speed	App. Wind Angle*	True Wind Angle	App. Wind Speed
4 kts	4.09 kts		46°	7.44 kts
6 kts	5.63 kts		44°	10.76 kts
8 kts	6.51 kts		41°	13.5 kts
10 kts	6.89 kts		40.3°	15.76 kts
12 kts	7.07 kts		39.1°	17.84 kts
14 kts	7.16 kts		38.3°	19.84 kts
16 kts	7.23 kts		38°	21.82 kts
20 kts	7.33 kts		38.2°	25.69 kts
25 kts	7.39 kts		39.5°	30.41 kts

**to be entered by owner*

DOWNWIND TARGETS *Simplified targets courtesy of Farr International*

True Wind Speed	Boatspeed	App. Wind Angle	True Wind Angle	App. Wind Speed
4 kts	3.84 kts	72°	138°	2.8 kts
6 kts	5.4 kts	79°	140°	3.9 kts
8 kts	6.5 kts	90°	145°	4.6 kts
10 kts	7.2 kts	106°	150°	5.2 kts
12 kts	7.7 kts	120°	155°	6.1 kts
14 kts	8.05 kts	135°	160°	7.1 kts
16 kts	8.37 kts	150°	165°	8.2 kts
20 kts	9.64 kts	148°	163°	11.2 kts
25 kts	14.1 kts	116°	146°	15.1 kts

Farr 40 Tuning Guide

TIPS FROM THE EXPERTS

When you tune the rig, think of the diagonal shrouds as the checkstay. While their main job is to keep the mast straight sideways, they do serve to control fore & aft bend.

Will Keyworth
North Sails Chesapeake

Set the rig to the guide & keep a log for your boat. This will get you to the fastest settings and let you duplicate your winning ways.

Will Keyworth
North Sails Chesapeake

=The shape of the main is heavily dependent on the amount of prebend, which is a function of the mast step position. I don't think shroud tension or jack pressure has a whole lot to do with it.

Mike Toppa
North Sails Ft. Lauderdale

After sailing upwind with at 8.4 knots, we rounded the weather mark on HISSAR and watched the speedo hit 16 knots! It was easy to forget I was on a 40-footer because the boat was in total control at all times. The non-overlapping jibs and fractional spinnakers are just right.

Mike Toppa
North Sails Ft. Lauderdale

Farr 40 racing is is extremely close. There is always a large group of boats that round the first weather mark together on a windward/leeward type course. You can normally help yourself by jibing clear & trying to get into some open water so you can settle in and pick the proper sailing angle without having to defend your position. I will usually try to do this and also try to sail the long jibe first.

Jeff Madrigali
North Sails San Francisco

When sailing upwind in a big breeze and waves, carry the boom closer to centerline with less sheet tension (more twist) to help the helmsperson settle down through the waves without losing speed. Make sure you carry lots of vang tension in this configuration, and make sure someone releases the tension as you round the windward mark to help get the bow down. Mark the quick vang for the maximum tension and still be able to turn downwind postion.

Jody Lutz, North Sails East

For our first regatta on SOUTHERN STAR, with set-up notes from Mike Toppa and the target speeds from Farr, we set the rig up to Mike's standard and tried to sail to the targets. We used the light, medium and heavy standard headsails in the recommended ranges. We had no problem with our speed and ended up third in the regatta.

Grant Simmer
North Sails Australia

The boat seems to like traveller up in winds under 13-14 knots. Above that, I had the traveller logging many miles up and down it's track. We never centered the traveller except during prestart and downwind. It was played constantly. If I ever let it stop, Madro would comment on it. Our vang was loose upwind..it was set for downwind. We didn't vang sheet like some of the boats.

Fuzz Foster, North Sails Hawaii

To better observe fleet tactics, you may be tempted to add window near the foot of your North 3DL mainsail. But a 3DL headsail allows you to see through the sail, which eliminates the need for a window and makes the sail stronger.

Tom Whidden
CEO North Marine Group

NOTE TO FIRST-TIMERS: Don't be mislead by the fuller jib. This is what the boat needs. Don't let it bother you—recalibrate your eyeballs. This will be like falling out of bed for you Soling / Etchells 22 / Mumm 30 / Corel 45 sailors. Remember, the boat is very weight-sensitive so work hard

TIPS FROM THE EXPERTS

on your cockpit choreography for tacking. The "new" sheet should be carried to the windward rail during the tack, and one light crewmember should add some wraps and do the fine trim when the jib fills on the new tack.

Tom McLaughlin, North Sails East

Barberhaul the headsail inboard in winds between 6-15 true (medium seastate). Pull the barber until the boat slows or target speed can't be reached.

Jay Hansen, North Marine Group

On fine tuning the location of the mast butt. Look for an even fore/aft bend and an even angle of attack on the leading 18" from gooseneck to S-2. Move the butt in 3/4" increments. Forward gives you a rounder entry and aft gives a finer entry with more wrinkles running from the cunningham.

Andreas Josenhans, North PRG

As your mainsail ages, you will need to ooch the mast butt forward approximately 1mm per race (from the 13.0 cm setting described on p. 5). It is recommended that you reposition the mast butt forward 10 mm at a time, or once after each 10 races, to compensate.

Dave Scott, North Sails PRG

The magic for this rig is getting the correct amount of headstay tension without runners and without jumpers. Therefore the tuning has to be just right to allow the main to set correctly while transmitting the optimum tension down the headstay for a given windspeed and sea state. The combination of headsail luff curve/main luff curve and mast stiffness will allow the correct mainsail shape and headstay tension in all windspeeds.

Andreas Josenhans, North PRG

You'll get a different reading when the mast is being jacked up due to friction at the partners, so do the jack pressure reading while lowering the mast onto the plates. The reading is taken just when the plates can't be wiggled any more.

Andreas Josenhans, North PRG

In puffy conditions, as soon as the puff can be felt, head up to the puff and then build speed. The boat is so easily driven it pays to generate the pointing first and then match your speed to the wind velocity.

Andreas Josenhans, North PRG

When you are first setting the jack pressure to the recommended value, one turn on the upper shrouds equals 100 lb. of additional pressure. The diagonals are set exactly like an in-line rig. There should be tension but only one or two turns beyond hand tight. The acid test for diagonal shroud tension? The mast must be straight sideways.

Ken Read
North Sails Rhode Island

In light to moderate air, we sail with lots of twist, easing a lot on the mainsheet without losing helm. The traveller is to weather with the boom at centerline. As the wind increases we increased vang tension, but the traveller rarely goes below center. In 20 kts. true we sail with the vang on as hard as we could pull, leaving the traveller car in the center.

Ken Read
North Sails Rhode Island

Downwind, we sailed with the boom against the shrouds and vang looser than it looks like it should be. The spreaders fool you into thinking it's okay, when in fact it should be eased. We always hoisted out of the forward hatch (`a la Mumm 30) and never set out of the bag.

Henry Little
North Sails Rhode Island

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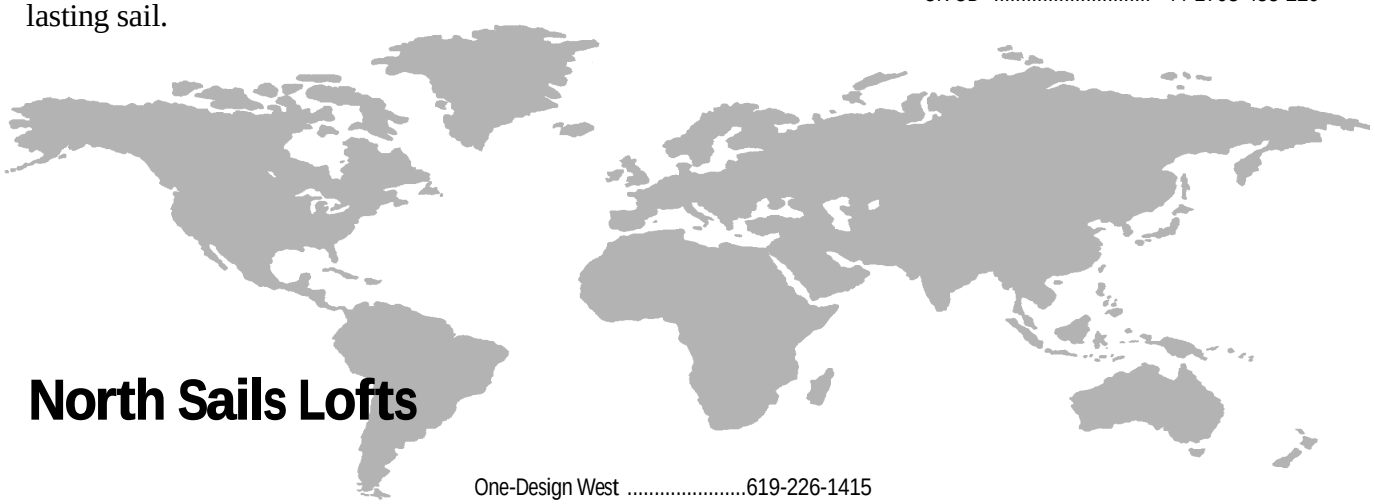

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