

Tuning Guide To The C&C 27 MkV

This tuning guide is formed from scanned images of a dealer bulletin put out by C&C in 1985 giving guidelines for racing the new Mark V model. They did extensive on the water testing with the prototype boat, *Smoke*, and gave the included advice.

Much of what is in here should be treated as a starting point for exploring tuning for your own needs, rather than as a hard-and-fast target to be hit. For instance, according to my sailmaker, Greg Bratkiw at Quantum, who has raced on Mark Vs extensively, these results apply to boats with lots of crew on board (4-5 experienced sailors) and which can be retuned (e.g., mast rake changed to suit the wind conditions) at a moment's notice. They might not be as relevant to a boat with roller furling that is usually single handed, such as mine. In particular, I find that the recommended 18" of mast rake would result in uncontrollable weather helm in any condition other than light air, unless there were lots of beefy guys on the rail. At 12" of mast rake my boat is great in light air but needs to drag the rudder sideways in very heavy air. At 6" of mast rake, it has slight lee helm in light air and is manageable in heavy air. What is ideal? Depends on your tastes and skill as a helmsman.

Pages 4 to 6 contain the C&C 27 MkV Speedpac data. The data table on page 5 and the graphic polar diagrams on page 6 give essentially the same information in different forms. These may be a little difficult to understand at first, but a few minutes analysing them makes the data comprehensible and very interesting. There are good lessons contained about helming the boat both upwind and downwind. Optimum VMG angles are not what most people would steer intuitively. I just wish they had published a diagram for white sail downwind performance. But the spinnaker data is useful – under jib and main I would just add "more so" to the off wind optimum sailing angles.

Bob England

May 15, 1985

TO ALL DEALERS

DEALER BULLETIN #85-036

TUNING AND RACING THE C&C 27

As sailors set their boats up for the 1985 season, here are some tuning tips for the C&C 27.

The C&C 27 prototype was tested and raced extensively during the 1984 season on the Great Lakes. We learned how to get the most out of the boat for any given wind-speed or angle. I hope that it will be of help to both the racing and the cruising sailor.

Rig Tuning

The C&C 27 likes to have a lot of rake. On SMOKE we carried about 15" with about 4" of pre-bend. Shroud tension should be moderate, to balance both pre-bend and transverse straightness. The spar tends to go into compression bend a little early so be careful!

Preparation

The 27 is a production boat, and inherently has a little more weight in the ends than a custom boat. It is imperative that you concentrate the internal weight (gear, sails, loose equipment, etc.) over or near the keel. This will reduce your longitudinal pitching gyradius, thus helping avoid the tendency to hobby-horse in light wind with a left-over chop.

In setting your boat up initially, try to keep the deck layout simple and uncluttered. This will avoid crew confusion in close quarters or heavy weather maneuvers. The "SMOKE" package was designed to do this, and should be considered if serious racing is intended.

Light Air Sailing

A 170% genoa gives the required horsepower in light air to accelerate out of a tack and get moving upwind. The advantages in boat speed far outweigh the small price paid in rating that was applied in both MORC and PHRF.

Weight distribution and trim are crucial in light air. When sailing upwind, keep the weight centralized and a bit forward. Try to avoid too much crew movement and most importantly, don't oversheet the main.

Downwind it is a must to get the transom out of the water. Do this by, again, moving crew weight forward. On SMOKE we noticed a half knot increase when the transom was out. When practising, try different crew positions and sails to get the most speed out of your boat in light air.

Heavy Air Sailing

We found that the C&C 27 was at its best in heavy air upwind sailing. Here, you must try to keep the transom in the water. Yachts with this type of hull form tend to go bow down when heeled. This situation reduces valuable sailing length and makes the boat harder to steer. Moving both crew weight and gear weight as far aft as possible will cure this problem. It is important to remember that this does not just happen upwind, but in any excessively heeled conditions.

Downwind the boat should be sailed just like a dinghy. It can handle almost full downwind sail area in heavy air and is still very easy to steer. The C&C 27 will surf very easily, however a helmsman's expertise in steering the boat through waves will greatly improve performance.

Due to the 27's high center of gravity, close reaching with an all purpose spinnaker in heavy air should be avoided. The boat will go just as fast and be more controllable with a white sail or a very flat reaching spinnaker.

I hope that this will help your 27 owners maximize the speed potential of their new C&C 27s.

Yours truly,



Len Ramsay
Manager - Marketing Services

LR/ddg

Speedpac

The enclosed outputs represent a computer programmed projection of the potential performance of your new boat.

In order to generate these numbers, we floated the hull at a typical weight and fitted the normal sailplan to it. As you can see the boat is run at several different wind speeds.

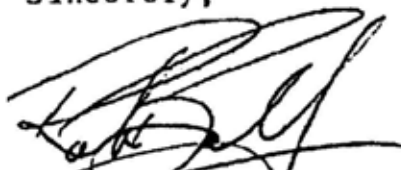
The polar plot shows that optimum upwind performance is achieved at varying angles to the wind and similarly, optimum downwind numbers are achieved by steering somewhat higher than dead downwind particularly in the lower wind ranges. The upper half of each curve represents performance with genoa and main sail only while the lower section is with the spinnaker. Speed in any direction can be measured from the origin out to a point on the curve.

The actual performance predictions are presented in a series of columns. The left column is the true wind speed, the second column being the true wind angle. The third column is the apparent wind speed and the fourth column is the apparent wind angle - the direction one usually sees with onboard sailing instruments. The fifth column is your potential boat speed while the sixth column represents the speed made straight upwind or VMG (velocity made good). The seventh and eighth columns represent heel angle and leeway. The final two columns show the flattening of sails and reefing. The computer actually takes the air foil shapes of the sails and flattens them as the wind velocity increases and similarly, reefs the sailplan down when heel angles are too high. These numbers will help in determining how to achieve the optimum performance from your boat.

C&C Yachts offers a full fledge SPEEDPAC for any of our designs. This is a much more comprehensive package and includes a variety of charts which help you to sail your boat more effectively. There are conversions from apparent wind to true wind and vice versa, there is a complete chart for optimizing upwind performance as well as another chart for optimizing downwind performance. At the same time there is a much more comprehensive list of performance numbers and these can help you considerably in calibrating your instruments and achieving target boat speeds for a given sailing condition. A complete users manual is included.

If you would like more details on this package, feel free to contact us.

Sincerely,



Robert W. Bali
Chief Designer





Speedpac

PERFORMANCE PREDICTIONS



MAINSAIL AND SPINNAKER

5.0	180.0	2.8	180.0	2.285	-2.285	0.0	0.0	1.00	1.00
5.0	135.0	3.6	98.6	3.317	-2.345	0.6	0.4	1.00	1.00
5.0	90.0	6.7	55.7	4.403	0.000	2.5	1.4	1.00	1.00
5.0	145.3	3.2	115.4	2.955	-2.430	0.3	0.2	1.00	1.00

MAINSAIL AND GENOA

5.0	80.0	7.2	50.5	4.265	0.741	2.4	1.8	1.00	1.00
5.0	60.0	7.9	39.9	3.964	1.982	2.7	2.5	1.00	1.00
5.0	45.0	7.8	32.4	3.315	2.345	2.7	3.5	1.00	1.00

MAINSAIL AND SPINNAKER

10.0	180.0	5.9	179.9	4.284	-4.284	0.2	0.1	1.00	1.00
10.0	135.0	7.3	104.7	5.759	-4.073	1.5	0.4	1.00	1.00
10.0	90.0	12.0	62.7	6.514	0.000	9.2	1.9	1.00	1.00
10.0	153.2	6.0	141.4	4.778	-4.436	0.6	0.2	1.00	1.00

MAINSAIL AND GENOA

10.0	80.0	12.8	55.8	6.380	1.108	9.1	2.4	1.00	1.00
10.0	60.0	14.0	42.2	6.079	3.039	15.4	3.3	1.00	1.00
10.0	42.5	14.3	31.2	5.250	3.863	16.7	4.6	1.00	1.00

MAINSAIL AND SPINNAKER

15.0	180.0	9.3	179.9	5.938	-5.938	0.5	0.1	1.00	1.00
15.0	135.0	11.5	112.1	6.935	-4.903	2.4	0.5	1.00	1.00
15.0	90.0	15.6	67.2	7.138	0.000	22.9	2.3	1.00	0.96
15.0	171.4	9.3	165.8	6.052	-5.985	0.7	0.1	1.00	1.00

MAINSAIL AND GENOA

15.0	80.0	16.7	58.8	6.940	1.205	23.3	3.0	1.00	0.96
15.0	60.0	18.4	43.2	6.423	3.211	23.3	3.8	1.00	0.88
15.0	40.0	19.3	29.2	5.505	4.160	21.4	4.9	0.79	0.92

MAINSAIL AND SPINNAKER

20.0	180.0	13.5	179.9	6.918	-6.918	0.8	0.1	1.00	1.00
20.0	135.0	15.8	116.0	7.915	-5.597	3.5	0.7	1.00	1.00
20.0	90.0	19.8	70.3	7.436	0.000	24.0	2.4	1.00	0.83
20.0	173.0	13.5	169.2	7.003	-6.951	1.1	0.2	1.00	1.00

MAINSAIL AND GENOA

20.0	80.0	20.9	61.0	7.157	1.243	24.6	3.2	1.00	0.92
20.0	60.0	23.0	44.1	6.561	3.281	24.6	4.0	1.00	0.75
20.0	41.4	24.1	29.4	5.622	4.215	23.0	5.3	0.81	0.78

Speedpac

POLAR SPEED PLOT

1985

