



# Vanguard Sailboats Club 420 Coaching Manual

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### **1) Introduction To The Club 420**

The Club 420 was essentially born in 1977 when Yale Corinthian Yacht Club delivered to Vanguard an order for 24 420's, to be built of a more rugged hull lay-up than the existing International 420's. The Yale sailors recognized the 420's fine sailing characteristics, but were frustrated by the boat's fragility in the hectic college sailing environment. To go along with the rugged hull construction, the Yale sailors specified a more durable untapered spar for these boats.

As more and more sailors were exposed to the Yale boats, demand for them grew. The boat's durability struck a chord with junior program organizers, who approached Vanguard with the idea of rigging a College 420 with spinnaker and trap gear to be used in their junior programs. This boat caught fire in New England, with several hundred appearing in junior programs, especially in Massachusetts.

Doublehanded junior sailing in the US was fragmented with many different boats. All of the boats in other regions lacked the cost effectiveness and durability of the Club 420, and soon other regions decided that the Club 420 fit their needs and adopted it.

Currently, Club 420's are sailed in every area of the country. They are used in every major junior and youth championship in the US, as well as countless other regional championships. Fleets of over 100 boats are common throughout the East Coast, and the boat's popularity as a junior trainer continues to spread.

### **2) Setting The Boat Up For Sailing**

A large part of the Club 420's popularity comes from its simplicity. The boat is easy to rig.

Most sailors have found that the mast step, which is the only major setup component not adjustable on the water, should be in its forward most position. This puts the mast in the best position for a balanced sail plan.

Beyond the mast step position, all other adjustments can be made on the water.

### **3) Sailing The Boat**

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## Sail Trim

The one area in which sailors used to other boats may get tripped up is the mast rake. It is usual to set most boats up with make rake such that the boom is parallel to the water or sloping slightly down from the gooseneck. Not so in a Club 420. The starting point for light to medium winds is with the boom sloping up slightly from the gooseneck. It looks dopey but it's fast. This allows greater pointing, as it allows the jib leech to be tensioned properly, and also contributes to a balanced helm. Only when the sailors are actively looking to depower the rig should the mast be raked aft. The shrouds are normally pinned ½ hole down from the top on the standard Vanguard shroud adjuster. This position works from drifting conditions until the crew is flat out on the wire. Advanced teams should be encouraged to change their shroud lengths on the adjusters as conditions change.

The forestay is only under tension when the jib is down. With the jib raised, the luff wire inside the jib will act as the forestay. The tension of the jib halyard thus becomes a key aspect of tuning. The most successful setup usually has the jib halyard tensioned so that the leeward shroud is *just* beginning to go slack when sailing upwind. The leeward shroud shouldn't be loose, it should just have a little slack in it. As you go from very light air to full trapezing conditions, you will pull the jib halyard about 2" to keep the correct amount of rig tension. In flat water, more rig tension can be used. In big chop, try keeping the rig just a bit looser than normal.

As the breeze comes on, you will need to drop the shroud pins down on the adjusters. When the boat begins to plane upwind, the shrouds should be dropped down 1 hole on the adjuster. In fully overpowered conditions, the pins go down another hole from there. The more powered up the boat is, the tighter you can pull the jib halyard. In overpowered conditions, it will be hard to pull enough jib halyard tension on.

The only other major setup thing is the mainsheet bridle. Class rules allow the block mounted on the traveler bar to be removed from the traveler bar and attached to a bridle. The bridle allows the boom to be trimmed closer to the centerline of the boat, radically increasing the boats pointing ability. The bridle must be length adjustable to accommodate the different boom heights at different mast rakes. We suggest a bridle with two loops in each end (see diagram), which you use to adjust the bridle's length and thus the traveler block's height. The bridle is attached to the brackets that hold the traveler bar to the boat by means of .25" x 1.25" fast pins. As the mast is raked back, the traveler is shortened by pinning the short loop to the bracket. We haven't yet found the magic number for traveler bridle length, but if the leeward section of the bridle is loose, the bridle is too long. This destroys your pointing ability. The bridle is the perfect length when the two sections are equally tensioned when the mainsail is trimmed for upwind sailing. It is far better to have the traveler bridle too short rather than too long. A bridle that is too short will allow you to trim with adequate leech tension, but the boom will be slightly off of centerline. A bridle that is too long will both put the boom off centerline and prevent you from getting proper leech tension. A loose mainsail leech is perhaps the biggest detriment to upwind speed and pointing in a Club 420.



Assuming the mast is raked and tensioned correctly and the bridle is the correct length, getting good speed out of a Club 420 is relatively easy. Club 420 races are generally won with good upwind pointing rather than speed, as the boat doesn't seem to speed up drastically by footing

Jib trim is unique in a Club 420 in that you will normally trim both sheets when going upwind. This is because the jib lead position is so far outboard that it must be brought in with the weather sheet for good pointing. Begin by trimming the leeward sheet hard enough so that the foot has a fairly flat draft, then pull between 2 and 4 inches of weather sheet (2" in very light air or big chop, 4" in medium breeze and flat water). Finally, give a second, small trim on the leeward sheet to prevent excessive twist. As the breeze continues to build, the weather sheet gets used less and less. When you are really overpowered, don't use the weather sheet at all. Trimming the jib to its natural lead provides the correct angle of attack for planing upwind. Many boats use outboard leads to pull the jib lead out when the breeze is on – the 420 does just the same thing in the opposite way, pulling the lead in for lighter air.

Mainsheet trim is pretty basic. In very light air, you will trim the main so that the top batten telltale is nearly constantly flowing. It should stall every once in a while so you know you are not under trimming the sail, but it should flow regularly. Trimming too hard kills speed, too soft kills pointing. As the breeze comes on, you will start to stall the top batten telltale. When both sailors are sitting on the rail, beginning to hike, the telltale should stall about 30% of the time. When you are beginning to use the trapeze, the mainsheet should be pulled very firmly. The batten will stall regularly. This is good for your pointing and will not hurt speed. As the breeze really comes on and you are raking the rig back, you will notice that the top batten telltale flies nearly constantly no matter what you do. Trim the mainsheet as hard as you can, and the boat will go faster and point higher.

The next major adjustment beyond the sheets is the vang. Upwind, the vang tension equates pretty closely with wind speed. In light air, use light vang. In heavy air, use heavy vang. In really heavy air, pull the vang on until it is quite firm. The goal in heavy air is to allow the mainsheet to be eased in puffs with the vang tight enough so that the boom doesn't rise at all as the mainsheet is eased.

The outhaul is not as important on a 420 as it is on some other boats. It should be fairly firm in light air, a little looser in medium air, especially if there is chop, and it should be firm in big breeze. The outhaul controls the depth of the lower third of the mainsail. If it is too loose in light air, the flow over the lower third of the sail will constantly stall. This is the most common outhaul mistake.

The cunningham is really not that critical in a Club 420. If you are overpowered, pull it on. Otherwise, the mast is so stiff that the cunningham is not needed to pull the draft forward. When you pull the vang on hard, the mast will bend a bit and there will be small wrinkles



coming back out of the mast onto the main. Pulling the cunningham will iron out these wrinkles. The cunningham is only used when the boat is fully powered or overpowered.

Downwind sail trim is relatively easy. The outhaul gets eased about 3" and the cunningham is eased completely, whether you are reaching or running. On a reach, the vang will be kept about where you had it upwind. On a run, the vang is eased to the point where the leech is just tensioned. It is a bit hard to describe, but if there is a hard angle in the leech at the top batten, the vang is too loose. If you pump the boom with your hand and the leech is floppy, the vang is too loose. The leech should be a fair curve while running.

Spinnaker trim is in and of itself a huge topic, and the Club 420 follows every basic rule you have ever learned. One thing that most Club 420 sailors leave out of their spinnaker trimming routine is the pole height adjustment. It is rather critical. On a run, the pole should be high enough so that the clews fly even. On a reach, the pole should be lowered. This moves the draft of the kite forward into a more powerful reaching position, and more importantly opens the leech. The open leech helps you speed in two ways. First, it reduces drag. This is important. Second, it allows better mainsail trim as the air flowing out of the kite will be flowing straight aft as it should be and will not be directed right at the mainsail. Another common mistake in spinnaker trim is allowing the spinnaker pole to hit the forestay. This causes a loss of pointing and speed. The pole bends around the forestay when it is allowed that far forward, which causes the leech to hook badly, which is what we are trying to avoid by reaching with the low pole. It also causes the spinnaker to get more full, which radically reduces top end reaching speed. The spinnaker pole should ALWAYS be kept off the forestay.

On a Club 420, the jib stays up when you are going downwind. The jib should generally be under trimmed just a little bit compared to what it would be if the spinnaker were not up. If the jib is over trimmed, it will cause the kite to be extremely finicky to trim. The jib should not be luffing, but it should definitely be breathing.

### **Body positions and technique**

The first fundamental rule of 420 sailing is that you must keep the boat flat. Everything works better when you are flat – the hull's footprint in the water is minimized, the projection of the sails is maximized, the efficiency of the foils is maximized and the helm is neutral. The 420 rudder is so large that any extra rudder movements radically hamper your boatspeed.

Upwind, it's important to keep the weight concentrated in the boat. The skipper and crew should be together at all times. In light air, this will mean both sitting forward in the boat, with the skipper entirely in front of the traveler bar. In more moderate air, the skipper will move aft until she is straddling the traveler bar and the crew is just forward of her. In heavy air, the skipper will be entirely aft of the traveler bar, and the crew's back foot (the crew at this point is on the wire) will be up against the driver's thigh.



The point at which you optimally start to trapeze is dependant upon course length. Getting out on the wire initially costs a small bit of height, which on a shorter course could prove disastrous. There is no doubt that using the trapeze to keep the boat absolutely dead solid flat is the fastest way to get upwind in the absence of other boats, however on a crowded short course you may find that your tactical options are better served by hiking and pinching. In any case, it is absolutely critical that the Club 420 be sailed flat upwind. If you are heeling, you are not going as fast as you can.

In very breezy conditions, it will pay to raise the centerboard slightly going upwind. Probably a Club 420 race would not be held in conditions requiring the board to go more than 1/3 of the way up, but you never know. Raising the board does three good things when you are overpowered: it decreases heeling force, it moves the center of lateral resistance aft which balances a raked rig, and it decreases drag. All of these things will be a big help in monster breeze.

Tacking a 420 is one of the most basic skills in sailing. Turn the boat slowly into the wind, keeping both sails trimmed in. As the jib goes into a full back, both sailors should roll explosively. As the boat comes over on top of the sailors, the jib gets uncleated and the sailors get to the other side of the boat to flatten it on the new tack. As the crew is crossing the boat, the old leeward jib sheet is released and the new leeward sheet is trimmed in. The jib should not be luffing at any point during the tack. It goes from full on one tack, to fully backed, to full on the new tack. As it gets windier and windier, the roll becomes less explosive. When the crew is on the trapeze, the roll is so small that it is barely detectable. The force of the breeze performs the roll for the crew and the most important body movement is getting across the boat and flattening it completely and immediately out of the tack.

Downwind technique revolves around getting the crew in a position where he can see and trim the kite effectively. On a run, the driver will sit to leeward with the crew on the weather tank. It is important, particularly in light air, to keep the crew weight rather far forward on a run. The fore and aft positions on a run should closely relate to the upwind position for the same breeze. Sinking a 420's transom in light air is fantastically slow.

On a reach, the same fore and aft weight philosophy applies – move aft as the breeze picks up. In light air, both skipper and crew will be trying to move their weight into the center of the boat. In extremely light air, it can pay for the skipper to sit to leeward, allowing the crew to sit to weather and see the kite. The fore and aft position when trapping on a reach is exactly the same as for going upwind, however, skipper and crew will be moving fore and aft surfing the rail in waves.

The centerboard is an often underestimated and underutilized control. Downwind, it goes right up so that there are only a few inches of the leading edge exposed. On a reach, the board position can have a huge effect on your speed. When you are just at the point where the crew is trapping, the board should be far down – only about 1/3 of the way up from the full down position. In this position, the board will power the boat up and allow the crew to



get on the wire earlier. The power that the board gives you in this circumstance far outweighs the drag it causes, and a boat with the board down and the crew out on the wire will blaze away from a boat with the board up and the crew on the rail.

Setting the spinnaker is straightforward. The Club 420 rules prohibit a long hiking stick which would allow the driver to set the pole while the crew drives from the wire, so the pole gets set after the rounding. On the best sets, the boat is turned onto a run, the driver pulls the halyard up and begins dragging the guy back, with the guy having been placed in the reaching hook prior to the set. The sheets are marked so the driver knows when the sheet is aft to the point where the pole will be just off the forestay. In the meantime, the crew is setting the pole. The pole is always set the same way. First the outboard end is clipped to the guy, then the topping lift hook goes on, and then the pole is clipped to the mast. This allows the crew to do all of his work without reaching anywhere. If the boat is going to turn up to a reach, the driver cleats the guy at the maximum pole forward position, and reaches for the sheet. As soon as the crew has the boat set, he grabs the sheet from the driver and positions his weight for the conditions. If the leg is a run, the driver continues pulling the guy aft until the crew is able to take the guy after grabbing the sheet. At the point where the hand off of the guy is made from helm to crew, the skipper should make her way to leeward and sit on the tank as the crew sits on the weather side of the boat.

#### **4) Boat Maintenance**

The Club 420 is cared for just like most other boats. It should be hosed off with fresh water after each use. Optimally, it is then covered. The spars and all fittings should be doused with lots of fresh water as there are stainless fittings attached to aluminum tubes and this will cause corrosion if salt stays on these parts. The rudder should also be hosed liberally after each use. Spray water down the centerboard slot to get any contaminants out of there, as they will scratch the finish right off the centerboard. I also like to use McLube on the board and inside the case to make sure these surfaces stay as clean as possible.

Empty all tanks and make sure the inside of the boat is dry. Water left standing in the boat will rot the centerboard pivot assembly and has a generally negative effect all over your boat.

The sails should be rolled after every use. The main gets rolled from the top batten down, the jib from the head down. The spinnaker should never sit wet in the bag overnight. Dry it as best you can without having it bake in the sun (UV and flogging are the two worst enemies of a sail) and flake fold it.

All fittings should be checked regularly. Areas to pay particular attention to are the shrouds and trap wires (check for broken strands and rust at the terminals), and the tiller extension (if your universal joint breaks, your race is as good as over).