DOYLE SAILMAKERS J/105 TUNING GUIDE

INTRODUCTION

The J/105 has become the success story of one-design racing. The class is one of the largest cruiser-racer one-design fleets. Easily sailed with a small crew, the responsive design allows the J/105 to be fun to sail with only a main, jib and asymmetric spinnaker. Here we will explore the process required for success with your J/105 racing program. Success in one-design can be summated into one sentence: whoever makes the least mistakes wins.

Let us break this down into specific details and progressions towards advancement. The most important factor is boat speed. A racer's IQ elevates exponentially as your speed increases. Boat speed is created through enhancing many small features. Every time you comment 'that doesn't matter' write it down, because it does matter. Add up 10 insignificant items and you get something tangible. Add up 20 items and your sailing experience changes.

Be advised: there are many roads to victory and this tuning guide outlines certain proven techniques that are no way meant to be the only way. We expect the prudent racer not to consider this the bible but to add these concepts and techniques to your existing bag of tricks. Use this Tuning Guide to set up your boat, then use the Doyle J/105 Quick Tuning Guide for your on the water changes based on your boat and current wind conditions.

Doyle Sailmakers is happy to have and will continue to support the growth of the J/105 Class. We have committed specialists though out North America to help you get the most out of your boat.

The Doyle J/105 Team

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GETTING STARTED

BOAT PREPARATION

Buff your bottom: The fairness of your bottom and the correct shaping of your foils, keel and rudder are of paramount importance. A fair shape is faster than a smooth shape. A both fair and smooth bottom is fastest. A reputable shop should do the fairing. Use a high build fairing paint that will maintain the integrity of your blistering warranty. Perfect foil shape will allow the blades to work to maximum efficiency. Along with a fair bottom, allowing minimum drag will result in a maximized boat speed potential. Everything done while sailing should be geared to maintain foil and hull form efficiency. The keel is the reason the boat goes forward and not sideways.

Minimum Weight: Drag is slow. Keeping the boat at minimum weight will result in greater boat speed. Anything less in the boat will result in greater boat speed except crew weight, which is movable ballast. Keep everything that is not required, off. Keep all required gear centered and as low as possible. Store everything including lunch under the main cabin bunks. No bilge water, cooking stuff, dock lines, extra clothing, cruising sails, engine manuals, stamp collections, etc.

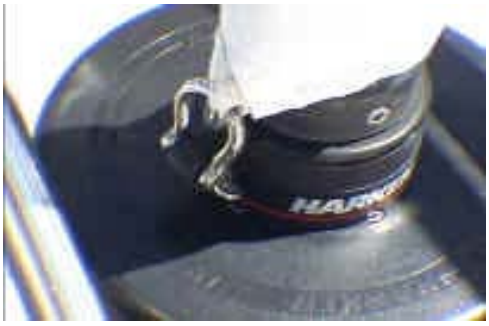
Weight Aloft: Sailing is physics; righting moment vs. wind pressure equals boat speed. Weight up the rig decreases righting moment exponentially. Again anything not required is slow. Use minimum weight halyards (3 only), small size Windex (unlighted) and minimal weight wind instruments. No masthead VHF, lightning rods or Tricolor lights. Remove any redundant wiring.

MAST PREPARATION

From a pure racing perspective the keels on most J-boats are set too far aft in the boat. This gives the boat neutral helm for a more forgiving feel as the breeze comes on, but creates an imbalance in the sail plan. The boat basically has lee helm. This is a problem in light air. If you sail the boat flat, you physically have to steer the boat to go upwind, requiring rudder drag and negative lift to get the boat to weather. This imbalance is enough to be detrimental in all wind conditions. To compensate for this, make sure the boat is setup with maximum rake (the mast tipped aft as far as possible). Never sail with anything less than the maximum amount of rake. As the wind builds, reduce helm by de-powering the sail plan and hiking harder, keeping the boat flat and going faster.

Forestay Length: The forestay must be maximum length 13,035mm from the center of the forestay attachment on the mast to the stem sheer line intersection on the bow. You may

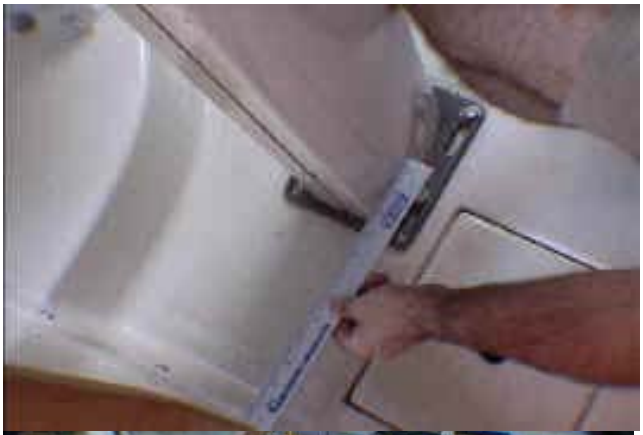
need to take the extra toggle off the backstay and add it to the top of the forestay to make the forestay long enough.



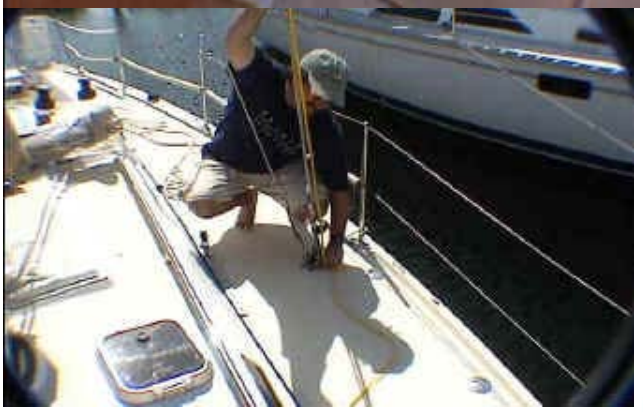
Make your furling drum as close to the deck as possible. Ideally we will have the adjustment screw on the bottom of the furler all the way in. The stay length can be fine-tuned with toggles on the top of the stay and the internal adjustment screw on the furler. Use a small shackle on the drum to attach the jib. This keeps the jib close to the deck and creates an endplate effect, increasing the efficiency of the jib.

Measuring with the mast down: First measure the distance from the stem sheer line intersection to the center of the forestay pin on the bow tang. Then measure the forestay, center of pin to center of pin, for the difference. Secure the locknut on your furler turnbuckle, and you should not need to touch this again.

Measuring with the mast up: Place a mark on your mast 1,000mm down from the top of the black band at the gooseneck. Attach a metal tape measure to your jib halyard and pull tight to the top. (The metal tape measure has less stretch than the halyard.) Measure to the mark on the mast. Pendulum the tape to your forestay and make a mark at the same measurement. The distance from this mark and the stem sheer line intersection is 1,270mm. Secure the locknut on your furler turnbuckle, and you should not need to touch this again.



Set Your Butt: With the shrouds loose and the deck chocking removed, loosen the mast base bolts. The aft face of the mast should be 9 5/8" from the bulkhead aft (not the molding). Tighten the backstay to just take the slack out of the forestay. This should give you 1" of bend in the mast (pre-bend). Make sure the mast is square in the boat and retighten the bolts.



Center the Rig: Hoist a tape measure up the genoa halyard. Measuring from side to side to the base of the chain plates, center the rig using the upper shrouds only. Don't tension to create a compression bend, just enough to keep the mast from flopping around. Keeping the intermediate shrouds loose hand tension the lowers keeping the mast perfectly straight. It may help to have the backstay a little snug.

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Deck Chocking: The mast will be choked all the way aft at the deck. Apply a small piece of sailmaking leather or 1/8" rubber to aft side of deck hole to protect the mast as it rests there. Older boats with the larger mast holes should place a ½" chock aft. With the mast centered the mast may not be in the middle of the mast hole. You must chock the mast in this position, keeping the mast straight. With the mast is centered side to side and perfectly straight, chock the mast side to side and in front to have no play. Many times we will Spartite the deck hole at this point.

Mark your spreaders: Install 2 1" tape marks on your lower spreaders at 4" and 6" from the tip for future reference. We usually sail with the leech of the jib between these marks.

DECK AND RIGGING DETAILS

Many of these suggestions are commonly seen in the class but are subject to your own fleet rule interpretations. Check with your local measurer before changing anything on your boat.

*Remove all dodger fittings from the deck
*Remove any extra snuffer cleats or fairleads.
*Jib and Main halyards should be lead to the port stoppers. Spinnaker halyard should be the inside starboard stopper.
*Cunningham should be a simple 8-1 cascade at the mast. We use a Harken 245 and 046 parts for a 4-1 purchase with 245 cleat attached to the vang ring and the 2-1 line passes through the sail and dead ends around the boom. Total weight less than ½ Lbs.
*Move mainsheet swivel base to front side of traveler.
*Add a 2-1 fine tune to your mainsheet as per class rules.
*Tack line should be a tapered spectra line with a small J lock.
*Change or remove the standard tack line cam cleat and replace with a clutch, or as some do, relocate your fairleads and use the extra port outboard cabin top clutch.

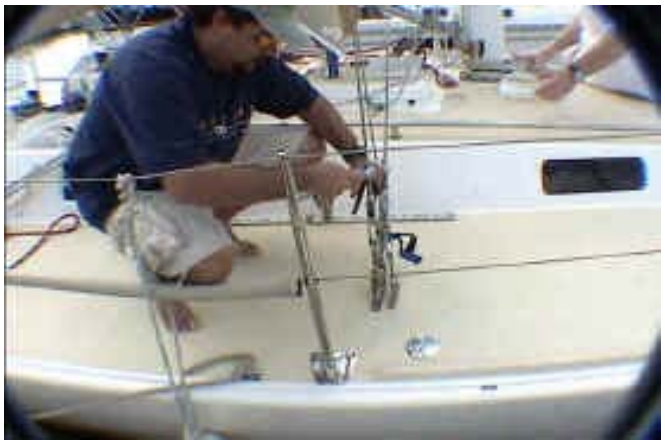
*Your spinnaker sheets should be tapered spectra with a Y connecting strip of about 2' to tie to the spinnaker. Don't use any shackles, they may catch and tear your chute.

LINE GUIDE

Jib Halyard:	3/16" 12 strand Vectran to 5/16" Tail with eye splice shackled to furling swivel
Main Halyard:	3/16" Vectran to 5/16" Tail with 2' cover at shackle
Spin Halyard:	3/16" Spectra to 5/16" Tail with snap shackle
Jib Sheets:	3/8" Spectra Cored Braid
Mainsheet and Fine Tune:	3/8" Spectra Cored Braid
Spin Sheets:	5/16" Spectra Cored Braid Y connection and 20' cover stripped back
Tack Line:	3/8" Spectra Cored Braid with 20' cover stripped back and small J lock
Traveller:	5/16" Light Spectra Cored Braid
Cunningham:	5/32" Spectra Cored Braid
Pole:	5/16" Ultra Light Braid
Reef Line:	3/8" Ultra Light Braid

SETUP & TUNING

These are general numbers to get you started. Each boat will tune a little differently and the Loos gauges we use are not consistent either. Make sure you understand the underlying goals of tuning and you will be able to adjust your own numbers accordingly. Using a Loos #10 Rod Tension Gauge, tune the upper shrouds to 51 and the intermediates to 21. Leave the lowers at just hand tight. This is your base setting for 8-12 knots of breeze. This should also give you just a hint of prebend with no backstay on. If your mast shows more than 1" off prebend or conversely, none or some inversion you may need to adjust your butt again. Not all bulkheads are equally installed in the boats.



The goal is to keep the mast as straight as possible. With the minimal sweep of the spreaders and the size of the spar section the mast is soft for this size boat. We need to keep the mast as straight as possible to maintain its ability to support the forestay as the breeze builds and backstay is applied. This also allows the mainsheet tension to actually autotrim the headstay. With a stiff and straight mast as you tension the mainsheet or backstay more energy is applied directly to the forestay. The straight mast also allows for the most projected mainsail area as roach is pushed out to back of the sail.

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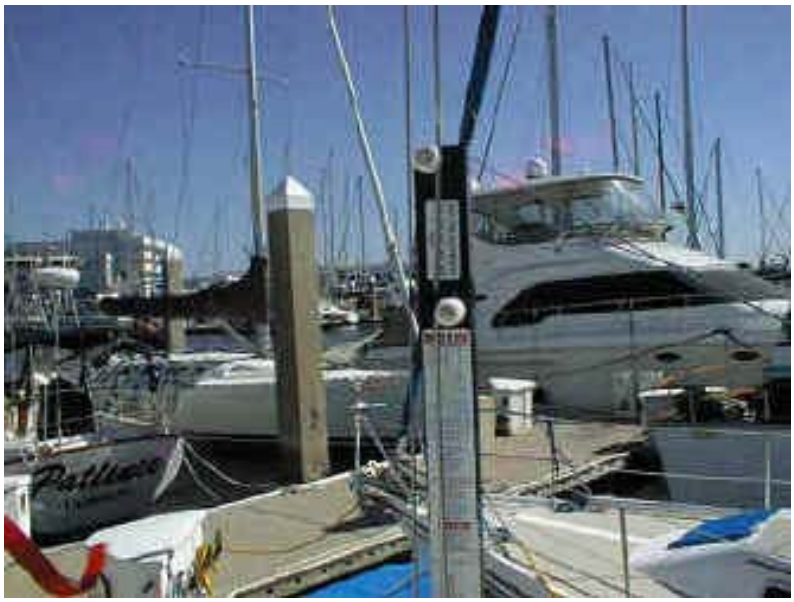


Note: With the opposite, a pre-bent mast, as sheet or backstay is applied the mast bends easily and the forestay remains too soft which is a real problem as the wind builds. Some people have tried to use lower shroud tension to stop over bending and this works for fore and aft bend but pulls the mast out of column side to side, creating the same problems with rig stiffness.

All this rig tuning is done to allow the mast to fit your sails and for your sails to be as flexible as possible to work through the entire wind range. We are asking 3 little sails (only 2 upwind) to do the work that as many as 10 sails might have done on similar boats under handicap rules. This is how we do it:

Rig Settings New Scrim Boats (old pre-scrim boats)				
Wind	**Uppers**	**Intermediates**	**Lowers**	**Headstay Sag**
Light 2-10	38 (47)	9 (17)	6" circles (snug)	10"
Medium 10-20	48 (51)	14 (21)	hand tight (12)	6"
Heavy 20+	51 (60)	21 (27)	12 (20)	6"

The goal of this tuning is to keep the rig in column side to side with the leeward shrouds just with a hint of going slack, while maintaining the correct amount of headstay sag.

INSTALLING YOUR NEW DOYLE SAILS

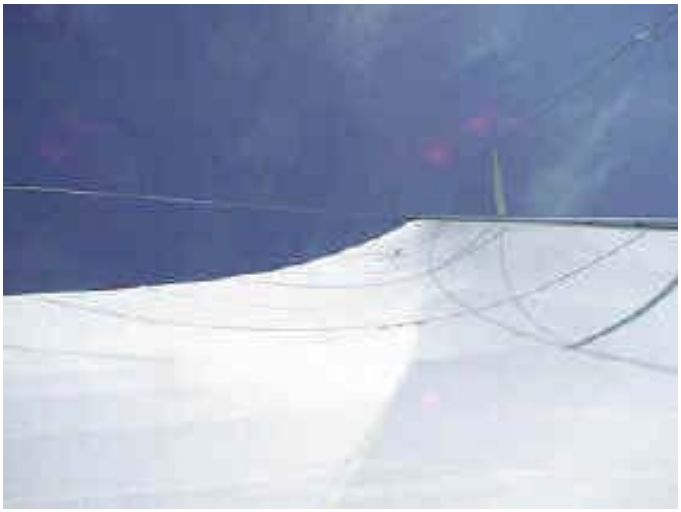
Roller Furling Class Jib: Make sure you have a small shackle at the furling drum and not a snap shackle or connector. Keep the tack of the sail as low as possible. This sail has no UV cover so if you store it on the furler, use the optional jib cover sock to protect it from damaging UV rays. Hoist the sail up by hand until the cloth is snug. Mark your jib halyard as it enters the stopper and add 2 marks in front of this mark at 2" intervals for quick reference.

Class Radial Mainsail: Lay the sail out on the deck and install the battens, tapered end in, as marked. We use a heavy and a light top full-length batten. We use the heavy in winds over 10 knots. We like to roll the main to store it on the boom removing the slides from the mast when the sail comes down. Hoisting the main with the Allslip slides is pretty easy. Again mark your halyard for future reference.

Class Asymmetric Spinnaker: This is launched from the forepeak out of the forward hatch. See sailing setup.

SAILING

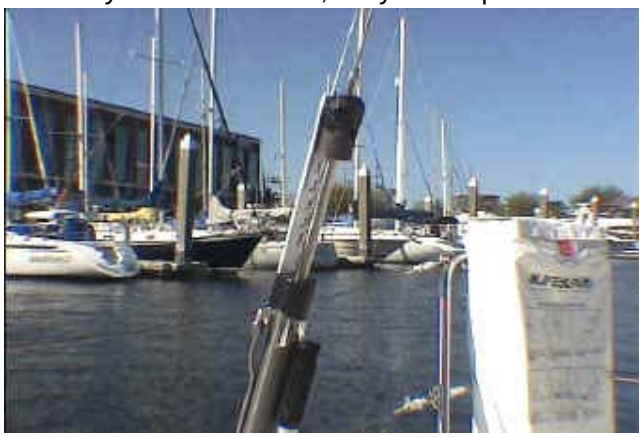
MAINSAIL TRIM- UPWIND



Halyard: Adjust halyard tension to keep the draft (deepest part) of the sail at 45-50%. You will have slight wrinkles in luff in winds to about 12 knots true. Basically keep tightening the luff as the breeze builds.

Cunningham: Set your halyard tension to the lulls for the beat and adjust your luff tension with the cunningham as the breeze changes on the beat. Use no cunningham below 10 knots. Snug cunningham in 10-20 knots to remove the wrinkles. Above 20 knots, apply the cunningham firmly. If the wind builds consistently remember that your halyard will have to be tighter on the next upwind.

Sheet Tension: DOYLE designs the sail, so you can trim hard without it closing the top too quickly. Keep the top batten parallel with the boom and the top telltale flying. When you are at full speed, trim a bit harder to get the top telltale to start stalling. It will flicker about 50% of the time. In light air with lump conditions open this up a bit, maybe have the top batten 5 degrees open and always let the top telltale fly. In heavier air, as you de-power the top will open up.



Traveler: Keep the boom on centerline until you have to de-power. In very light air, pull the traveler all the way to weather and adjust the sheet to keep the boom on centerline. Use the traveler to de-power in puffs, vang sheeting seems to be slow in all but survival conditions.

Backstay: This is not the quickest tool on your boat, so use it as a general trim adjuster.

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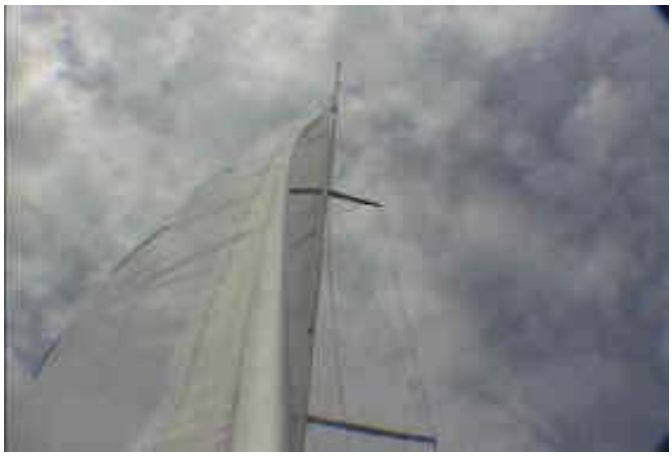
Tape a batten to the cylinder to record your settings for the next beat. In light air, keep it slack. As the breeze builds and the crew is hiking, just remove the slack (about 2"). As the breeze builds, above 12 knots continue to increase tension as required to keep the boat flat, about 1" for every 2-3 knots of wind until it is maxed in heavy air (22+). You should not invert the main, which you will see by wrinkles forming from the clew up towards the midluff. Make sure to crank on the cunningham as you start to use heavy backstay to keep the draft forward in the sail.

Outhaul: In light air, ease the outhaul about 1" in flat water and 2" in lump. Once the crew is hiking, tighten just to close the shelf foot. As breeze builds, continue to tighten to keep the foot tight and the shelf closed. In heavy air, crank the outhaul hard. In lump, you might ease it out an inch or two to increase power down low.



Vang: Keep the vang slack in light to moderate air. When you start to de-power consistently, remove the slack and in heavy air trim it tighter. Sheet the vang in very heavy air, over 25 knots. This allows the vang to take the job of the traveler. When sheeted for the lull, the lightest you expect to see for the breeze, tighten the vang firmly. Don't slam it too hard, just firm and deliberate tension. Set the traveler to put the boom on centerline and trim the main with the sheet. This will allow the main trimmer to stay forward on the rail. Make sure to ease the vang when rounding the weather mark or have to duck a starboard boat.

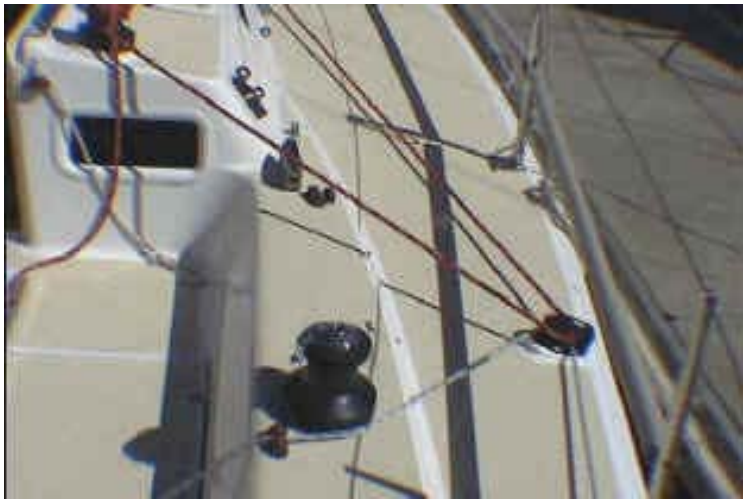
***Leechline*:** Only use this to remove leech flutter and remember as the breeze lightens ease it off.

Mainsail Trim – Downwind: Make sure to ease the main out enough as you go downwind. In light air you will sail higher angles and have it in more and as the breeze build you will ease it out. Until in heavier air when running deep downwind, you will have the boom eased to the shrouds. Ease the backstay ALL the way off. Ease the outhaul until the foot of the sail is about 3" from the boom. Ease the cunningham and halyard until wrinkles just start to form. Adjust the vang to always keep the top batten parallel to the boom. Trim the main based on the forward luff of the sail. Ease until the front luffs and pull it in just enough to remove the luff and keep testing this. Make sure to remember your halyard, backstay and outhaul settings for the next upwind. We use the jib to help pull the mast forward. After furling the jib cleat the furler line and take one of the jib sheets to a primary winch. This is about the only time we use them. Pull the sheet tight to take any slack out of the forestay.

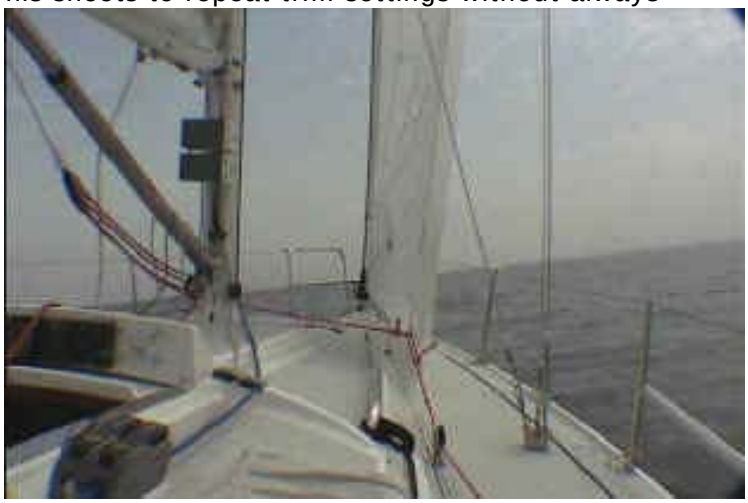
JIB TRIM

Halyard: The jib halyard is very important and frequently forgotten on these furling boats. Always adjust, like the main, to correctly position the draft. The draft should be at about 35-40%. In light air you will have wrinkles in the luff in moderate air just tighten to remove the wrinkles and pull very tight in heavy air to keep the draft forward. In heavy air tightening the luff of a sail also opens up the leech allowing the sail to depower.

Lead: The lead should be set to allow the luff of the sail to break evenly. On a close hauled course head up and watch the front of the sail and the telltales luff. If the top telltales break first move the lead forward. If the bottom breaks first move it back. This is your base position. In light lumpy conditions, move forward 1 hole. As the breeze builds, de-power by moving the lead aft about 6" in very heavy air.



Sheet: Trim the sheet to the leeward cabintop winch. Keep a wrap around the windward winch with the lazy sheet; you will be using this. Trim to the telltale on the leech of the sail at the top batten. Trim the sail in until the telltale just starts to break and ease it back out to even. This is the base setting. Out of a tack or in slow speed conditions we keep this eased a bit from this point. When up to full speed in flat water, trim to have the telltale breaking 25% of the time. This is the sheeting range to maintain. Trim to the cabin top so the trimmer does not have to move far off the rail to get to the winch and can see the sail and telltale. Keep the lazy sheet on the windward winch for inhauling. A good trimmer will mark his sheets to repeat trim settings without always looking at the telltale.



Inhaul: We use the lazy sheet to adjust the athwartship lead of the jib. The DOYLE jib is uniquely designed to enjoy this type of trimming. Conventionally designed sails have a tendency to stall on top when inhauled (leech telltale won't fly). The rule of thumb is this: Flat Water Moderate air; The base setting is 2" inhaul (3" for older boats with tracks further outboard). When you are up to

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speed inhaul to 3" and if you need to really point to make a mark or pinch some one off, inhaul to the handrail. Don't do this for long because it is high and slow. In light lumpy conditions, inhaul to 3" and ease the sheet a bit to keep the sail powered up but open up top. As well, in very light air do not inhaul, to keep the slot very open. In moderate air, play the inhaul in modest puffs so you don't have to leave the rail. If you are consistently de-powering, stop using inhaul, unless you hit a lull or are in choppy conditions and need the extra punch to get through the waves.

SPINNAKER TRIM

Sailing with the asymmetric spinnaker can be easy and successful if you follow the basic rules. Almost always sail with the halyard all the way up. Trim the sail to have a slight curl in the luff (about 6"). Adjust the tackline to keep the curl just above the middle of the luff. If it breaks high lower the tack, if the break is at the bottom raise the tack.

Average tack heights:

Very Light - 0"
5 knots - 6"
10 knots - 1'
15+ knots - 2'

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