

# ***MAINSAIL TRIM GUIDE***

The fundamental principals of mainsail trim are outlined in this guide. For more detailed information, contact a Quantum Sails Consultant.



## HALYARD & CUNNINGHAM (Luff Tension)

The tension required along the luff of the sail is a function of apparent wind velocity. In more wind more tension is needed—and vice versa. This means that you need to vary tension not only when the breeze changes velocity, but also when you change point of sail. Since there is more apparent wind when you sail upwind, you will need more tension than when sailing off the wind.

**TENSION HALYARD OR CUNNINGHAM SO THAT JUST A HINT OF WRINKLES APPEAR IN LOWER THIRD OF SAIL.**



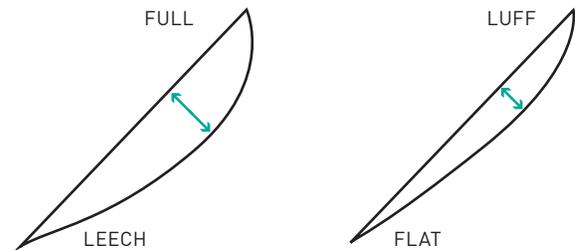
## HOIST

Hoist sail with minimum (hand tight) halyard tension. Sheet the sail appropriately for the point of sail (see section on sheet tension). With the sail now loaded, tension halyard just enough to remove any horizontal wrinkles emanating from the luff. Wrinkles will be at right angles to the luff. You can leave just a hint of wrinkles in light apparent wind velocity. As velocity increases, wrinkles will reappear and additional halyard tension will be needed. Avoid over-tensioning. A vertical wrinkle or, "gutter," parallel to the luff is a sign of too much halyard tension.

Ease the sheet and boom vang when adding halyard tension. There is no point in fighting a fully loaded sail. If you are trimming a racing mainsail, do not raise the head of the sail over the black band at the top of the mast, which delineates maximum legal hoist. If more luff tension is needed, use the cunningham to pull down and remove horizontal wrinkles. The halyard and cunningham do the same thing, provide luff tension—they just do it from opposite directions. If your mast is capable of bending, more bend will require more luff tension and vice versa. Add halyard or cunningham when adding mastbend; ease tension when straightening the mast.

## DEPTH (Power)

The deeper the curvature in the sail shape, the more power it creates. When the boat is not heeling too much in light to moderate apparent wind velocities, extra depth is desirable. When overpowered, heeling too much, and trying to sail upwind, a flatter sail shape is better. A mainsail will become fuller if the leech and the luff move closer together, flatter if they move farther apart. Imagine that the leech and luff are two edges of a sheet of paper—pushing the two edges closer makes a fuller shape; pulling them apart flattens the shape.



## OUTHHAUL

The outhaul controls depth in the lower third of the mainsail. Easing it adds depth and power; pulling on it flattens and de-powers. If the boat is heeling too far and developing weather helm, add outhaul. Upwind, the mainsail should generally be flatter than when sailing off the wind, so it is better to use more outhaul. Easing the outhaul will round up the lower leech and help pointing in smooth water and light to moderate conditions. The outhaul is usually only eased all the way off (approximately 100mm from maximum tension) when sailing off the wind. In light to moderate conditions when you need power and helm, ease the outhaul until the sail is 50mm-75mm from maximum tension and the foot shelf is partially relaxed. Increase tension gradually as the breeze builds.

**EASE OUTHHAUL TO CREATE DEPTH AND POWER IN LOWER THIRD OF SAIL.**



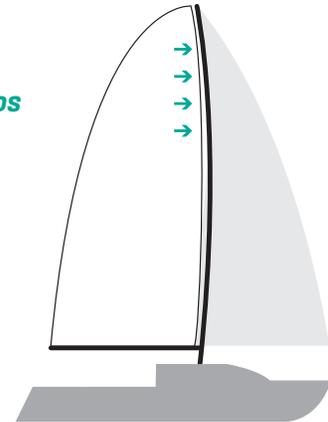
## MASTBEND

Mastbend is created by the compression induced by the backstay on a masthead boat or by a combination of backstay and running backstays on a fractionally rigged boat. When backstay or running backstays are tightened, the force is back but mostly down, pushing the top of the mast down toward the deck. This compresses the mast, and the middle of the mast pushes forward, pulling the luff away from the leech and flattening the sail.

Mastbend controls the depth in the upper two-thirds of the sail. The rules discussed in outhaul also apply to mastbend. With more mastbend, the mainsail will be flatter creating less heel, reducing weather helm, and allowing more control. Flatter mainsail shapes work best when trying to sail upwind. In light to moderate conditions, particularly off the wind, you'll want a straighter mast for a fuller sail shape. Many racing or performance boats have "checkstays" or running backstays connected lower on the mast, usually 45%-60% of the luff length. They keep the mast from bending too far when the backstay is applied and allow the trimmer to add more backstay tension to tighten the headstay without over-

bending the mast. A mainsail will develop "over-bend wrinkles" radiating from the clew up towards the luff if the mast is bent too far for the available luff curve.

**MASTBEND  
FLATTENS THE  
UPPER TWO-THIRDS  
OF THE MAINSAIL.**



## MAINSHEET

Sheet tension affects every characteristic of the sail. More than any other control, sheet tension will change substantially with changes in wind velocity and sea state.

On a reach, the golden rule "when in doubt, let it out" applies. Ease the sail until it begins to luff and you see bubble or backwind along its leading edge. Trim just enough to stop luffing. The mainsail will need to be eased further than you think. Don't be afraid to let the sail out until it is against the shrouds and spreaders. Just make sure the boom vang is on tight enough.

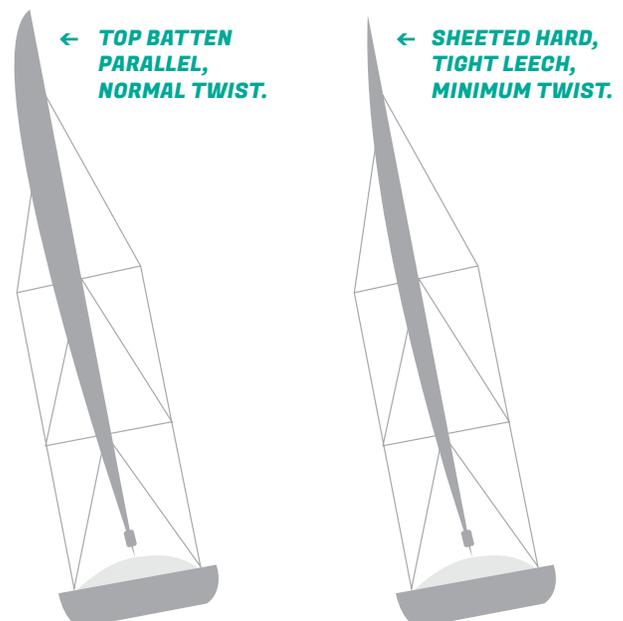
For perfect trim on a reach, ease in every puff. Conversely, the sail will probably need to be trimmed in lulls. If the boat is overpowered and heeling too much in a puff, the sheet can be eased, allowing the sail to luff and spill excess power.

Off the wind, the mainsheet simply moves the sail in and out of the boat, changing the sail's angle to the wind. Upwind, as the sail nears the centerline of the boat, the mainsheet begins to pull down, affecting the twist. Twist is the change in angle of attack from the bottom to the top of the sail. It is a measure of how open the top is relative to the bottom of the mainsail. Tightening the mainsheet tightens the leech of the sail, reducing twist and rounding up the back of the sail, which forces the boat up into the wind and makes it point. Easing the mainsheet opens the leech, inducing twist and accelerating the flow of air across the sail, which encourages the boat to bear off and accelerate.

How far the mainsheet can be trimmed to help the boat sail upwind effectively is a function of wind velocity and boat speed. In more wind, the mainsheet can be trimmed tighter without causing a speed loss and pointing will improve. With less breeze, be careful not to over-trim or the boat won't accelerate. Keep in mind another fundamental rule of sail trim: speed first, and then try to point. Start with the mainsheet relatively eased and gradually trim harder once the boat is up to speed.

Start with enough mainsheet tension so that the top batten is approximately parallel to (pointing in the same direction as), the boom. The top telltale will just be on the verge of stalling (disappearing behind the leech of the sail). In light air you will need a more open leech. The sheet will be eased from the median setting so that the top batten points 5-10 degrees to leeward.

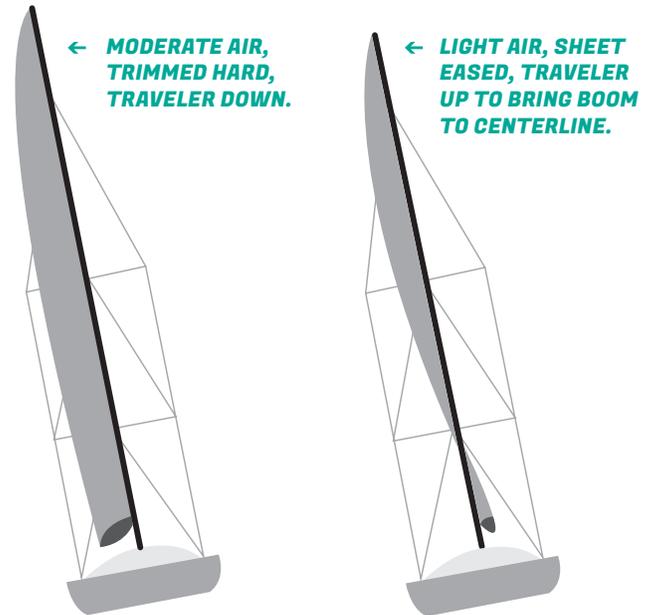
Finally, the mainsheet is the primary pressure relief valve when the boat heels too far. Ease and let the sail luff to let the boat get back "on her feet." Ease whenever the heel is greater than 25 degrees on most monohulls, or whenever there is too much weather helm on any type of boat.



## TRAVELER

The traveler has two functions: It controls the boom's angle to the wind, and it steers the boat, controlling helm and heeling in puffs and lulls. Boom angle is a function of mainsheet tension. Set the twist with the mainsheet and then use the traveler to position the boom on the centerline for maximum power and pointing, provided that helm and heeling are under control. This means that in light air, when the mainsheet is well eased to promote acceleration, the traveler car will need to be up to weather to put the boom on the centerline. It is the position of the boom relative to the centerline that counts, not the position of the traveler car itself. As the breeze builds and mainsheet tension increases, the traveler will gradually be dropped to keep the boom on the centerline and de-power the boat.

The traveler is great for fine-tuning the balance of the boat as velocity increases. Lower the traveler to control helm and heeling. When racing, play the traveler continuously to adjust helm in puffs and lulls. When cruising, find a happy medium that provides a good comfort level and keeps the boat from heeling too far.



## BOOM VANG

The boom vang takes over the job of pulling down on the mainsail clew and controlling twist when the boom is eased out for off-wind sailing. Just as you would with the mainsheet upwind, use enough tension on the boom vang to keep the top batten parallel to the boom. Upwind in light to moderate conditions, the vang is not used and is simply kept snug. In heavy air upwind it can be used to help the mainsheet pull down on the boom and maintain leech tension.

Pull the vang on hard, and you can ease the mainsheet rapidly in big puffs to keep the boat on its feet without giving away the whole leech. This technique is referred to as vang sheeting.

