



# ***Evolution Sails Thistle Tuning Guide***

## **Summer 2021**

Congratulations on your purchase of Evolution Thistle sails! We have worked hard to provide you with fast, easy to trim, and the most durable Thistle sails possible.

This guide for the Thistle has been developed through extensive testing, tuning and practical racing experience by some of the top Thistle sailors in the country.

Please read through these tips and set your boat as close to the suggested numbers as possible. While we cannot guarantee immediate victory by following this guide, we can assure you that you will be taking a big step in the right direction!

Please feel free to call on any of your Evolution Thistle team with any questions about the setting up, trimming and care of your new Evolution Sails. We are always glad to help!

### ***Your Evolution Thistle Team***

***Greg Griffin***

***904 226 0770***

***Greg Fisher***

***410 212 4916***

***Karl Felger***

***216 346 0878***



## Before the mast is stepped

### Set the mast butt position.

Set the butt casting on your grating so the mast butt is close to the minimum J of 4'9". This is measured from the forestay to the front of the mast. Ideally, the casting will be set so the front of the mast casting is even with the front of the mast butt casting.



### Grab your tension gauge(s)

The Loos Tension gauge is an import tool to help set up your mast and rig tension for proper performance. There are two styles: the older, silver Model A and the newer,



**Model A**

black PT-1. Experience has shown that the PT-1 is the most consistent gauge and most durable. However, it does not readily read lower pounds especially on smaller wire. (Like our 1/16" diamond wire!) Ideally the PT-1 would be used on the forestay tension and the Model A on the diamonds. However, both will do ok for both areas, but please note the Model A has a shorter accurate life expectancy and the PT-1 readings need to be "interpolated" in the lower ranges.



**PT-1**

| <b>MODEL A</b>      |                    |     |
|---------------------|--------------------|-----|
| <b>LBS. TENSION</b> |                    |     |
| Loos Part No. 91    |                    |     |
| <b>SCALE 3/32</b>   | <b>CABLE DIAM.</b> |     |
| 5                   | 80                 |     |
| 10                  | 110                | 1/8 |
| 15                  | 150                | 120 |
| 20                  | 200                | 160 |
| 22                  | 230                | 180 |
| 24                  | 250                | 200 |
| 26                  | 280                | 220 |
| 28                  | 310                | 240 |
| 30                  | 350                | 260 |
| 32                  | 400                | 300 |
| 34                  | 470                | 340 |
| 36                  | 580                | 390 |
| 38                  | 750                | 450 |
| 40                  |                    | 550 |
| 42                  |                    | 700 |
| 44                  |                    | 950 |
| 45                  |                    | 600 |
| 46                  |                    | 700 |
| 47                  |                    | 800 |

Here are the numbers vs. pounds on both gauges.

Note that 1/16" wire is not referenced on either guide.

Note that the headstay is 1/8" on the Thistle.

300lbs is 32 on the Model A and 24 on the PT-1.

| <b>Loos</b>                       |                    |     |
|-----------------------------------|--------------------|-----|
| <b>PROFESSIONAL TENSION GAUGE</b> |                    |     |
| <b>MODEL PT-1</b>                 |                    |     |
| <b>LBS. TENSION</b>               |                    |     |
| <b>% BREAK STRENGTH</b>           |                    |     |
| <b>SCALE 3/32</b>                 | <b>CABLE DIAM.</b> |     |
| 5                                 | 70                 |     |
| 8                                 | 100                |     |
| 10                                | 125                |     |
| 13                                | 160                | 110 |
| 16                                | 200                | 150 |
| 18                                | 240                | 180 |
| 21                                | 300                | 240 |
| 24                                |                    | 300 |
| 26                                |                    | 345 |
| 28                                |                    | 390 |
| 30                                |                    | 450 |
| 32                                |                    | 500 |
| 35                                |                    |     |
| 38                                |                    |     |

## **Adjust your diamond tension.**

Proper diamond tension is important for ideal mast bend. Not only do the diamonds play an important role in controlling side bend, but they effect fore and aft bend as well. Tighter diamonds will relate to a stiffer mast and looser will allow the mast to be softer. Obviously, all masts are not the same so we urge you to experiment with the diamond tension that will help your mast bend perfectly for your crew weight and mast stiffness. More on that in the mast bend section.

We suggest starting with a tension of 7-15-9 (bottom to top)- with the Model A gauge. The PT-1 model with read closer to 4-10-4. Remember these are numbers on the gauge and not representative of pounds.

The lighter your team, the lighter you would experiment with setting your upper diamond tension- a 440 lb. team would be close to 4 on the Model A gauge and the PT-1 would barely register.

Once, you have the diamond tension close be sure to check the straightness of the mast, loosening one side and tightening the other until the mast is smooth and straight.



## **Step your Mast.**

### **Check your rake, lateral straightness and rig tension.**

With a 50' tape measure hoisted all the way to full hoist on your main halyard, measure to the bottom of the tiller hole with your rig properly tensioned.

Your rake measurement should be 26' 11 1/2" - 27' 1". Your rig tension on the 1/8" headstay (the standard diameter in the class) should be very close to 300 lbs. (24 on the PT-1 and 32 on the Model A).

Check your mast's lateral straightness by sighting up the track again. If your mast was straight before you stepped it and shows a curve now, it very well may not be centered in the boat. Check lateral position in the boat with either the main halyard or the jib halyard (preferable) fully hoisted and measure to the top of the rail adjacent the shrouds from side to side. If the mast is within 1/4' side to side, that's plenty acceptable.

It should be noted that on some boats removing the sheaves on the top of the traveler car and moving the 2:1 purchase to the floor of the boat, may help lower the mainsheet trim position so the main can be trimmed tight enough in medium wind before two-blocking.



### **Check your prebend with full rig tension.**

Once the mast is stepped, your rake and rig tension close, there should be a slight gap in the front of the step between the butt and grating castings. See the picture on page 2. This slight gap should allow and encourage prebend in the mast (positive bend in the mast where the middle is pressed forward of the top and bottom) of approximately 1 ½". As the mast is loaded up by rig and sheet tension, the front will drop down and allow the mast to bend.



Measure this prebend by pulling the taught main halyard down from the top to the bottom at the gooseneck. There should be a gap of 1 ½-1 ¾ "between the halyard and the mast at the middle spreader. There are numerous clever ways to quantify this prebend and if you have any questions, please do not hesitate to contact us.

However, even more important than the actual prebend, is the mast's ability to rock easily on the aft section of the step. Actually, it is more of a "wiggle" where the mast is very easy to push back and forth fore and aft. Ideally when you'd press the mast forward and release, it will continue to rock/wiggle back and forth. The easier the mast bends and with the least amount of pressure to make it wiggle, the easier the boat will change gears and the main flatten out in puffs, etc.

### **The mast butt and shimming**

Certainly, the concept of the prebend, mast rocking, wiggle, the mast butt shape/angle, and shims is not foreign to most Thistlers. But it is this all important set up and the mast's ability to bend that is most important to top boat speed.

First, double check that the butt casting is secured in the mast itself and there is no slop. Some have epoxied the step into the mast to ensure a tight fit.

Second, make sure that the mast is secure in the step and the butt cannot move fore and aft on the grating casting (yet can still easily rock fore/aft on the step).

Finally, if your mast butt does not have the proper gap, prebend, rock, and wiggle, shim the mast with stainless shims at the very back edge to create that gap in front. Note there is a maximum shim height per class rules of 3/16". Some boats will require three shims to create the bend and action required for perfect mast bend.



The shims are simply stainless tangs or similar thin SS material.

# On the water and sailing

## Main Trim.

### Mast Bend and top performance

Now that we have our diamonds set, our mast butt, rake and rig tension properly positioned so there is the correct prebend and wiggle, our main should show the telltale signs of a properly tuned rig-**Overbend wrinkles**, again so critical in the Thistle are THE telltale sign the boat is set up properly.

These wrinkles will emanate from the mast a couple feet below the lower spreader and angle towards the clew. In light winds they will just be apparent, in medium winds they will be clearly visible and angle back halfway back in the vision windows along the foot. In big breeze, with maximum vang tension, the overbend wrinkles will slide aft to the back edge of the windows while the Cunningham tension will be near maximum. If in heavy winds the overbend wrinkles run well past the back edge of the windows, simply pull a shim out from behind the mast or place one in the front to restrict and control the excessive mast bend.

Below and right are examples of perfect mast bend and overbend wrinkles.

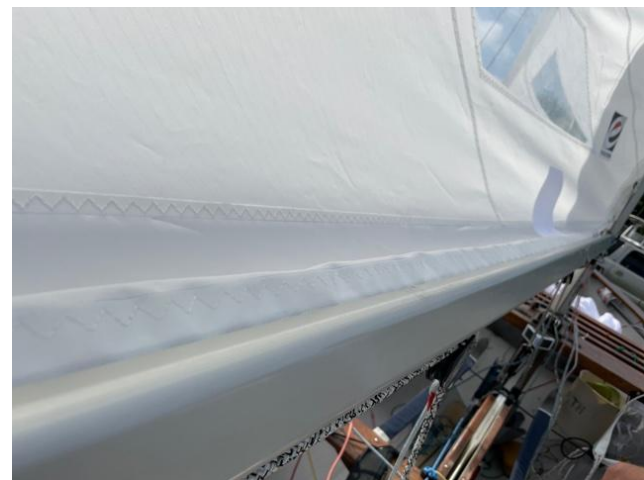


If your main seems unusually full up top (a “bubble” is evident in the luff/front of the main) try loosening the upper diamonds a couple numbers. If your main shows signs of overbend wrinkles in the upper or middle sections (higher than they should appear) tighten your middle and/or upper

diamonds slightly. Basically, the main should appear smooth and fair at the luff all the way down to the lower diamond, where our all-important overbend wrinkles should appear.

The main to the right would set up better with slightly tighter middle diamonds to minimize the overbend wrinkles at the middle spreader.

In the picture left the extra fullness in the upper section is indicative of slightly tight upper diamonds.



### **Outhaul Tension**

The outhaul will set the fullness in the lower section of the mainsail. To gauge proper outhaul tension, pull the outhaul so that there is maximum a 1 3/4-2" gap between the side of the boom and the shelf foot seam near the center of the foot. Once overpowered and maximum boom vang is applied, the outhaul will be pulled tight enough that the shelf seam is flush against the side of the boom. Note that it is easy to over tension the outhaul and only in the heaviest winds will there ever be a crease in the sail from tack to clew. If the outhaul is too tight, pointing ability will suffer, too loose and the main will stall.

On a reach ease the outhaul so the shelf seam is a few inches off the side of the boom (not more!). Dead downwind the outhaul should be left in the upwind position.

Unlike the Vang and Cunningham, the outhaul is not as dynamic an adjustment that is necessary to constantly adjust.

### **Boom Vang Tension**



Downwind, set your boom vang tension so that the upper batten is angled slightly outboard from parallel to the boom. When set properly the leech telltale should fly straight off the leech. The vang deserves constant attention downwind.

Upwind, when overpowered, the vang is tensioned quite hard. The tension not only allows the boom to move sideways when the mainsheet is eased, but more important, the heavy vang tension will bend the mast, flatten the sail, and help balance the helm- and boat. It is one of the more dynamic adjustments on the Thistle and in puffy, breezy conditions the vang should be constantly adjusted. In heavy breeze there will often be as much as 3-4" of bend in the boom when the vang is tensioned properly. See the picture to the right.

Just be sure to ease the vang when bearing away at the weather mark or when ducking a boat!

### **Traveler adjustment**

*In heavier winds/puffs* the traveler should be considered a rough trim to help balance the boat (actually balance the helm). The traveler will be



eased to leeward 2 to 10" and the mainsheet played to fine tune the balance. In lulls, the traveler will be quickly pulled back up, all the while adjusting the mainsheet.

Notice the traveler position on the boat to the right.

While constant adjustment to the mainsheet is always imperative, it is unusual that a super active traveler provides benefit to speed.

*In light winds*, when not tacking a great deal, pull the traveler to weather of center about 5-6" to keep the boom near centerline while maintaining proper mainsheet and sail trim. Check the picture at left. Note where the forward crew is positioned!

Never sail with the boom above centerline.

### **Cunningham Tension**

The Cunningham is the most under-utilized adjustment on the Thistle, yet deserves to be one of the most dynamic. The Cunningham plays an important role in positioning the draft in the main. Tighter, will move the draft (maximum depth) further forward, while an eased Cunningham will allow the draft to move aft. In theory, every time



the mast bends (when the vang and/or mainsheet is adjusted) the Cunningham should be adjusted to match. More trim, more mast bend, will relate to more Cunningham tension.

In practice this will not be distracting if the forward crew adjusting the Cunningham is automatically watching for wrinkle placement in the luff of the main.

While the drat position should be near 45-48% aft, it is difficult and unnecessary to truly gauge it. Instead look to have a smooth luff (few wrinkles) from the head to the spreader window in all but the lightest wind- when there will be wrinkles all the way along the luff, or in the heaviest breeze when the total luff will be nearly smooth except for the previously described overbend wrinkles.

But it is important to ease the Cunningham totally downwind!

Your **main halyard** should be fully hoisted in all conditions. Be conscious of checking for stretch if your halyard is line and not wire.

Please note that there is no need to use a tack pin on your Thistle main. Simply slide the **tack slug** in the mast tunnel, followed by the bolt rope as shown in the picture right, and hoist your main all the way to the top!



### Mainsheet tension

The most dynamic trimming tool on the Thistle by far is, of course, the mainsheet. It not only controls the angle of the battens and the leech profile, but it also bends the mast and balances the helm/boat. Proper mainsheet trim is determined by the angle of the top batten, and of course, feel.

In flatter water and ideal boat speed and pointing conditions, the sheet will be tensioned so the upper batten is hooked to windward as much as 15 degrees. The upper leech telltale will be stalled nearly 80% of the time, thus is not an ideal tool to help set mainsail trim upwind.

Instead, feel becomes the best indicator. If the helm feels “loaded” with excessive weather helm (tug on the tiller), ease the sheet quickly. If the boat feels balanced and powered up, do not hesitate to trim the sheet harder and allow the boat to climb. Of course, in light winds and lumpier conditions being gentler and easier on the sheet is in order. Be sure to ease to accelerate.

Anticipation is crucial and being ready to ease before a wave and/or puff makes a big difference.

Many Thistle skippers have removed their mainsheet cleats so they would not be tempted to cleat and ignore the needed constant and consistent mainsheet adjustment. If you still make use of your swivel cleat, be sure that you can easily ease and trim the mainsheet.



## **Jib Trim.**

### **Steering.**

The “groove” refers to that area where the boat feels the most comfortable sailing upwind. The lower end of the groove, when both the windward and leeward jib luff tell tales flow, is when the boat is building speed and power. Acceleration, punching through waves, rolling out of a tack are all times when both telltales should stream.

When the boat is at speed, the windward telltale will lift and indicates the boat is steering the middle of the groove. See the picture to the right.

In breeze, or when the boat is overpowered and has more power than speed, steer higher for brief periods of time to burn that power with both telltales stalled and at times, the luff will actually break/luff.

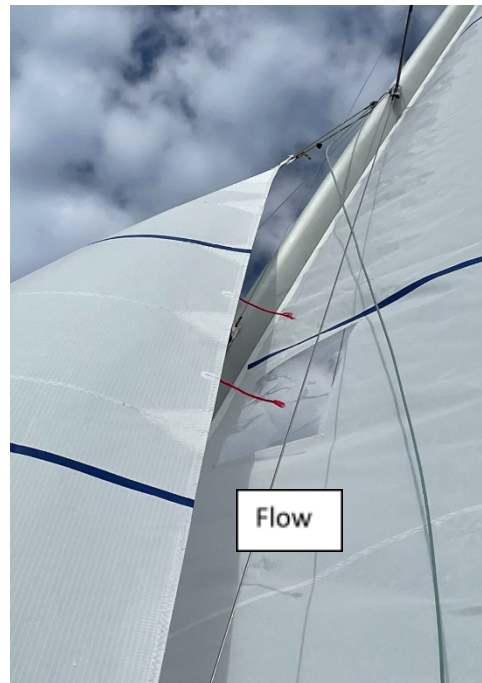
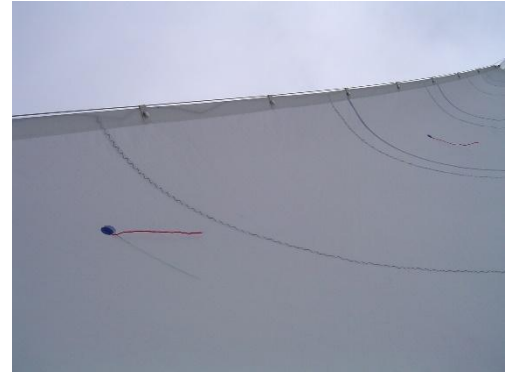
However, the boat will never sail in one area of the groove for long. The boat should constantly be steered up in puffs, down in lulls, waves and all the while the mainsheet is played to maintain the balanced helm.

### **Sheet tension**

While the distance of the leech from the spreader has long been considered a fine guide for trimming the jib, we must remember it is difficult to use as a consistent guide from boat to boat. Spreader lengths, mast bends, all effect this guide.

Instead, we suggest focusing on the telltales on the leech of the jib that are sighted through the spreader window. When the jib is trimmed properly these telltales will flow straight off the leech (unlike the main leech telltale!).

We urge you to trim until the jib leech telltales start to stall and then ease back out until they just flow. You may than you have previously and find better height and speed!



find you are able to trim harder

For those more comfortable still using the spreader position as a guide- measure from the side of the mast for an “ideal” trim point. For near max trim, the leech of your jib will be approximately 10 ½” off the side of the mast. You may try taping a flexible guide like a straw on your spreader to mark this position.

You will notice the skirt of your jib will lay inside the rail 2-3” at max trim and lay against the rail when accelerating.

But remember, when building speed, accelerating, sailing in challenging conditions (like big breeze and heavy chop), ease your jib sheet so the sail is well twisted. In extreme conditions the leech may be a full 13 ½” off the side of the mast.

### **Jib Halyard.**

In light winds pull your jib halyard so there are slight wrinkles along the luff emanating from each snap. As the breeze builds, tension the halyard more until in bigger breeze, the luff is completely smooth.

Never should there be scallops in the luff between the snaps.

The luff wire inside the luff of the jib will never go tight even in heavy breeze. It is simply included as it is required by class rules.

### **Jib Lead position**

Your Evolution jib has a trimline drawn on the clew. Position your jib lead so the jib sheet is an exact extension of the trim line. With your rake at 27’0” the lead should fall approximately 1” forward of the back edge of the thwart on the Great Midwest boat. In heavy breeze, when overpowered, move the lead aft 1” aft of the extension of the trimline position.

Laterally, the lead should be positioned so the *extension of the sheet* as it passes through the jib lead block intersects the thwart will be 15-15 ½” from centerline.



Note that the sheet is an extension of the trimline on the clew of the jib. To eyeball this alignment, lay a piece of line or straight edge on the sheet to check it is straight.

But using the trimline will ensure your lead is precisely in the correct spot no matter what type of jib lead block set up you have or the rake of your mast.

## **Spinnaker Trim.**

Set the topping lift so that your pole height will a) set the two clews even and b) the center seam of the spinnaker is parallel to the mast. Encourage the pole height up to a position that will set the skirt along the bottom of the spinnaker approximately 3-4' away from the forestay. There is flow out the bottom of the spinnaker and we want to avoid stalling the airflow exit. Constant and consistent adjustment to the pole height and fore/aft position is key, especially in light to medium breeze. A droopy leeward clew in light winds is very slow!

Play the sheet and pole position together with the pole position nearly perpendicular to the breeze. The sheet will be adjusted so there is an even 6-8" curl in the luff of the spinnaker nearly all the time. Be gentle with gradual trims and eases and avoid sharp jerks in and out to maintain flow over the spinnaker.

We suggest tying the halyard of your spinnaker with a long bowline so that the head is always 3-5" off the front of the mast which will help open the narrow slot up top between the spinnaker and the main.



### **A note about your main battens:**

Your new Evolution main has been delivered with 5 battens. There will be 2 for the top (std. and heavy), 2 for the middle two pockets and 1 for the bottom that is quite stiff. They may be marked 1,2,3,4,5. #1 will be the standard top batten and #2 will be the heavy top batten that we suggest placing in the sail when all three crew are hiking and the vang is tensioned hard. #'s 3 and 4 are the middle 2 longer battens and #5 is the stiff lower batten.

***Good luck and enjoy your Thistle sailing! Please contact us with any questions!***