



The Definite Guide to Optimist Trim

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The purpose of this tuning guide is to help you trim your WB sail optimally by learning the effects of the controls: How to change the shape and behaviour of the sail for different conditions. Remember that these are only guidelines - the winning setup usually comes from experimenting and changing the trim in the right direction, making the boat feel better.

The paper is divided into 3 sections:

- 1) A short introduction of the trim controls
- 2) More about tuning the Optimist
- 3) A quick summary for different conditions

If you have any questions please do not hesitate to contact us.

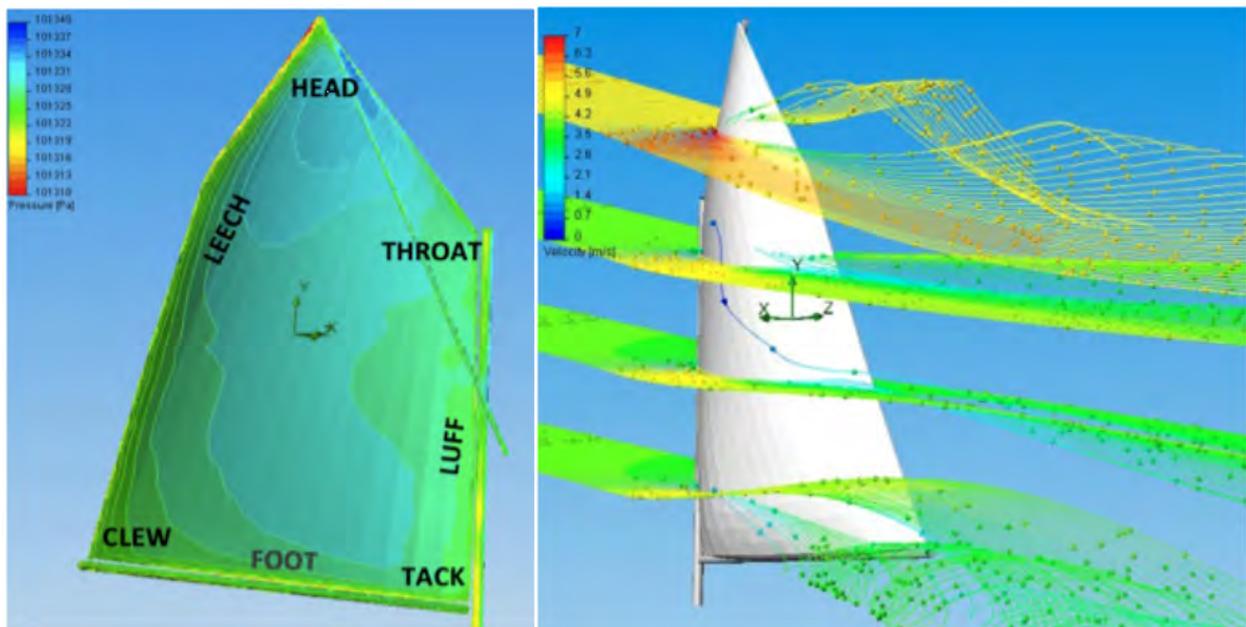


Fig. Some pictures of our CFD-research showing the flow around an Optimist sail.

A SHORT INTRODUCTION OF THE TRIM CONTROLS

Mainsheet: This is the most important trim. Controls the twist and angle of the sail. Trim for speed or height. Adjust it constantly and if the boat feels bad or slows down for some reason, ease the sheet. Have a looser sheet in wavy or unstable wind conditions.

Sprit: Controls the leech tension and depth. Have a loose sprit for an open and flatter sail in light and strong winds. And a tighter sprit for a closed deeper sail in medium winds. Small wrinkles perpendicular to the sprit is ok. In very heavy conditions have a big ugly wrinkle between the clew and throat.

Vang: Mainly for the leech tension downwind. Have a tight vang in strong winds to stabilize the boat downwind, and to keep the boom down upwind when easing the sheet a lot. Have a loose vang in light winds.

Mast Rake: By moving the mast step and tilting the mast forward or aft, you control the upwind balance of the boat (the pressure on the rudder). Raking the mast forward gives less weather helm and vice versa.

Outhaul: Controls the depth and power in the bottom of the sail. Tighten the outhaul in stronger winds to depower. Have it loose for power in choppy and light-medium conditions.

Boom preventer / cunningham: Affects the boom height and therefore the luff tension. Looser luff in lighter winds. Tighter luff in stronger winds to keep the shape forward.

Height preventer: Is regulating the height of the sail (at the throat) on the mast.

Centerboard: In heavy upwind conditions, lift it 10-15 cm to depower the boat and make it more stable.

Sail ties: Luff tied 1-2mm from the mast, foot tied about 8 mm from the boom. Five corner lines; diameter 3 mm and length 60 cm. Twelve eyelet lines; diameter 1.5 mm and length 50 cm.

Telltails: *The leech telltale at the top batten shows the flow in the top of the sail. This one is essential when adjusting the proper twist for the sail. The luff telltales are for steering (and sheeting).*

TUNING THE OPTIMIST

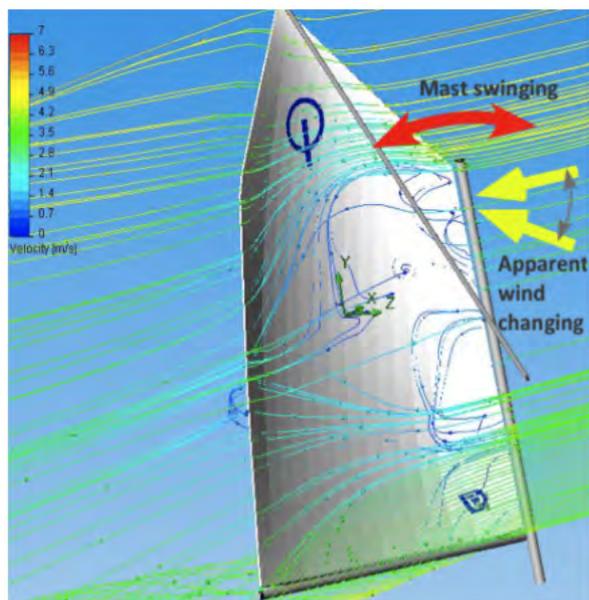
MAINSHEET

Upwind

The mainsheet is by far the trim that affects the speed the most, because it is directly changing the angle of the boom and twist of the sail. Be active with the sheet and adjust it constantly as the wind or the feeling of the boat changes even slightly, and also as you go through different sets of waves. If the boat feels bad or slows down for some reason, ease the sheet and get the boat going again.



Basically, the sail is sheeted so that the boom is above the leeward corner. The telltale at the back end of the top batten should fly at least 50% of the time. If it is most of the time stalled behind the sail, you need to twist the sail more open by easing the sheet, sprit or vang. In stronger winds, when getting over-powered, the telltale should, of course, fly all the time.



In choppy conditions the mast top is swinging back and forth through the air making the apparent wind for the sail very unstable. The waves also slow down the boat. This means that you need an open dynamic sail that accelerates you through the waves. Trim the main with more twist, by having a looser sheet (as well as a fuller sail shape, see more about the other adjustments below), driving the boat forward and allowing the leech to work more. Also in unstable puffy wind conditions, it pays off to have a more open forgiving leech.

Fig. Because the mast is swinging a lot in choppy conditions, the apparent wind will be very unstable. You need twist and a dynamic forgiving sail. The open leech gives also good drive forward when the mast swings backwards and the apparent wind comes momentarily more from the side.

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- If the boat feels bad or slows down, ease the sheet.
 - In medium-strong winds when a puff hits you, ease the sheet to accelerate the boat (and keep the boat flat). When the boat has accelerated, sheet the sail in again.
 - Before a set of bigger waves ease the sheet and accelerate. The open leech helps you through the difficult waves.
 - In light-medium winds, when you feel you have good pressure and speed, slowly tighten the sheet and steer slightly higher. Directly when you feel that you start losing a little power, ease the sheet quickly and steer down again to keep the boat going.

It may be a good idea to have a mark on the sheet for reference, so that you for instance quickly find the right trim after rounding the bottom mark. A good diameter for the sheet is about 6mm, but you can have a thicker one if you are small or for stronger winds.



Downwind

You should also have a mark on the sheet where the boom is 90 degrees out, which is the basic setup for the downwind legs. But, remember that this is just for reference. Play the sheet a lot when sailing downwind (pumping for surfing down a wave and adjusting when steering up and down). The sheet should be long enough, so that you can easily regulate the sheet even when it is all the way out.

In light-medium conditions the knot should be tied so that the boom can go out over 90 degrees. This way you have the opportunity, for example, to sail a negative course when approaching to the leeward mark. In very light winds it also pays to let the boom out over 90 degrees, so that the boom and sail stays out when you are heeling the boat to windward. This way you have better and more stable pressure in the sail when the mast is moving slightly due to the small waves.

In stronger breeze, move the knot so that the boom goes only out 90 degrees or even less for safety. As the wind picks up or if the boat becomes unstable, sheet the boom more back to get better control over the boat.

SPRIT

Upwind

The sprit also controls the tension of the leech and is therefore an important adjustment. A tighter sprit gives a tighter leech and vice versa. But, also very important is how the sprit is affecting the whole shape of the sail, acting like an extension of the mast (compare with a normal sailboat mast; easing the sprit on the Opti is like a bending a “regular mast“, which flattens the sail).



Fig. Small wrinkles perpendicular to the sprit are completely ok!

When sailing upwind, or when sheeting the sail ashore, the basic idea is to have the sail looking quite smooth with some small wrinkles appearing perpendicular to the sprit (throat-clew, see picture below). On the other hand, if there are wrinkles along the sprit (head-tack), the sprit is too tight.

In very light winds, it is very relevant to have enough twist and the top batten telltale flying at least 50% of the time. Therefore you need to make sure the sprit is loose enough and that there are some wrinkles across the sprit.

In medium winds you can have the sprit tighter for power. But, still you need to see some small wrinkles across the sprit when a puff hits you or when you are pumping the boat.

In heavy winds, when you get over-powered, ease the sprit so that you get a very large ugly wrinkle from the throat to the clew, dividing the sail into two parts. This will radically flatten and also twist the sail, so that you can keep the boat flat. The flat open sail also releases the pressure on the rudder and you can sail the boat much faster and steer it better through the waves. In these conditions you also need to pull the centreboard up about 10-15 cm, depowering the sail as well as the underwater foils.



Fig. The effects of the sprit tension. The red curves are showing a tighter sprit, and black curves a looser sprit.

An interesting thing to experiment with is to have a more flexible trim rope for the sprit in strong winds or for lighter sailors (or a softer sprit?). This would make the sail more dynamic and forgiving, like having a softer mast on a regular boat.

Downwind

On the runs, especially in lighter winds, you need to ease the sprit (to get rid of the “bad wrinkles” along the sprit), so that you get a more open and dynamic leech. This way the boat gets livelier and you can sail and also steer it better in the waves. In stronger breeze, do not ease the sprit, because you need to keep your weight back and a tight leech makes the boat more stable to sail.

VANG

The vang is controlling the tension of the leech, keeping the back end of the boom down, especially downwind. This trim is usually kept the same downwind and upwind. Set the vang so that the twist is good for the downwind and not hooking too much when sailing upwind in lighter winds.

In light-medium winds, the top batten should be parallel with the boom or just slightly more open. So, in the light conditions, there should be no tension on the vang when you go upwind.

In medium winds tighten the vang so that you have control over the boat downwind and it still feels lively enough. But, be careful, too much vang will kill the boat downwind and may also hook the leech too much upwind (top batten angled in from the boom). On the other hand, a way too loose vang will open the leech too much upwind when you release the sheet in gusts and waves etc., making the leech too sensitive to small adjustments.

Generally, the sail can be more closed in flat water and more open and dynamic in waves.

In heavy conditions, have the vang very tight for downwind stability. Upwind you will be able to sheet the boom more out and sail fast. To get it tight enough head up into the eye of the wind, pull the sheet all in and then cleat the vang.

Notice that, the preventer/cunningham (that controls the luff tension) needs to be set properly before tightening the vang. If the preventer is not on or too loose, the vang will only tighten the luff of the sail and will not keep the back end of the boom down.

RAKE

The rake is affecting upwind balance of the boat. The optimal mast rake is determined by the physics of the sailor, sail model and conditions.

Measure it from the rear of the mast top to the back edge of the transom of the boat. This measurement will also vary with different mast and hull brands.

A good starting point for the different WB sail models are given in the table below. (Because the L, heavyweight, model is more powerful and a bigger sailor can use more leech tension in medium-strong winds, the mast has to be raked more forward compared to the lighter models)

Sailor weight	Sail design	Mast Rake
Under 35 kg	S	281-284 cm
35-45 kg	M	282-286 cm
Over 45 kg	L	284-287 cm

Raking/tilting the mast back moves the whole sail more back, and therefore increases the load on the rudder. Raking the mast forward releases the load on the rudder and makes it easier to sail lower and faster.



When you are out on the water, with the base setup for the rake, get all the other trim controls right for the conditions. Sail the boat completely flat and feel the pressure of the rudder. It is optimal to have some pressure on the rudder, so that if you let go of the rudder the boat will turn by itself into the wind. Too much weather helm, on the other hand, will slow the boat down and make it difficult to steer. So, if the helm feels heavy and the boat turns very quickly upwind, when letting go of the rudder, you have to rake more forward (by moving the mast step backwards). If the boat is continuing straight or turning downwind, you clearly need to tilt the mast more back.

Notice here that the heeling angle, sail depth and twist affect the balance very much. Most often too much weather helm comes from trimming the sail too full or closed for the prevailing conditions! So, trim the sheet, sprit and outhaul before altering the rake.

In light winds, the best rake is usually the base value in the table above, but in more breeze you can often rake more forward to find a good balance.

In stronger winds, the balance is very crucial. You want to have good control over the boat and to be able to steer it nicely through waves and gusts. In heavy conditions, with the sprit trimmed very soft, centreboard raised and body weight far back in the boat, you can rake the mast more back again to find a perfect balance. But, still it is essential to keep the pressure on the rudder light enough.

OUTHAUL

The outhaul controls the depth and power in the lower part of the sail. A loose outhaul makes the sail deeper with a more closed exit, especially in the bottom (batten pointing more inwards).

In light-medium winds, and especially in choppy conditions, the outhaul can be quite loose to get enough power. Some wrinkles in the foot perpendicular to the boom are ok. Maximum out is when the wrinkles just touch the first seam.

When you get over-powered in stronger winds and the rudder feels heavy, you can tighten the outhaul so much that you get a big wrinkle along the boom. This flattens the sail and opens the exit of the lower sail. The angle of the lower batten has a big influence on the helm.

The flatter the water is, the more outhaul you can have for pointing. In choppy conditions or unstable winds you need a full and open sail (loose outhaul and twist in the top; sheet, vang, sprit) to keep the boat going through the waves or unsteady winds.



Fig. Effects of the outhaul trim. Red curves show a tighter outhaul, and blue curves a looser outhaul.

CUNNINGHAM / PREVENTER (“boom stopper”)

The cunningham, also called the lower preventer, is adjusting the tension of the luff. Tightening the luff will move the draft more forward in the sail and also flattening it somewhat, which is what you want to do when the wind is picking up.

The cunningham is trimmed by spinning the boom preventer rope about 0-3 turns. In lighter winds the mast is straight and you want therefore a loose luff, with even some very small horizontal wrinkles, to keep the draft back.

Use 2-3 turns on the preventer rope to keep the boom higher up and the luff loose in lighter conditions. In medium winds, when the mast bends more, have 1-2 turns on the rope to tighten the luff smoothly. In stronger winds have 0 turns on the preventer rope, so that the luff is very tight, depowering the sail. The preventer rope, with no turns, should be just long enough, so that the luff does not get way too tight in the strong winds and produce a fold behind the mast.

TOP PREVENTER

The height preventer rope in the top of the mast should be tied so that the sail is high on the mast in lighter winds (the measurement mark on the sail just under the upper mark on the mast). In stronger winds the sail can be set lower. Changing the height preventer will change the luff tension as well. It is, however, good to notice here that the basic trim controls are much more important than this relatively small height adjustment.

CENTERBOARD

When you get overpowered in heavy winds, you need depower the sail as well as the underwater foils. Pull up the centerboard about 10-15 cm to be able to keep the boat flat and more stable. This also helps you to steer the boat easier in wavy conditions. Some marks on the centerboard will make it quicker to raise the centerboard to the desired height.



Fig. WB-Sails' bestseller in the 70's.

On the downwind you should have the centreboard up all the way up to reduce drag. Mark or draw a line on the centreboard for reference when the centreboard is all the way up. Because the chock chord is slightly tilting the centreboard, maximum up is when the back corner centreboard is just going into the centreboard case and the forward edge sticks slightly out in the water (if the centreboard is raised even higher you will get more drag because of water going into the case). In heavy winds, you can lift it less, so that the boat stays more stable.

SAIL TIES

The luff curve of your WB sail is designed for a bending mast. All the luff sail ties should be tied so that there is 1-2 mm separation between the luff and mast. This way the sail rotates easily around the mast and the airflow doesn't go through the gap, making the sail and rig combination aerodynamically more effective. It is not necessary to readjust the ties in different conditions, when you are trimming the luff tension with the boom preventer the right way.

The foot of the sail should be tied loose, about 8 mm from the boom. Remember that due to the Class Rules, the maximum distance is 10 mm. The loose ties makes the sail rotate better around the boom and the outhaul to work more smoothly.

Standard dimensions for the sail ties are:

Corners (5 lines): 3 mm x 60 cm Eyelets: (12 lines): 1.5 mm x 50cm

TELLTALES

Trim and steer the boat upwind so that the luff telltales stream steadily aft in light and medium winds. The telltale at the aft end of the top batten pocket is essential when adjusting the proper twist for the sail. To get maximum lift this leech telltale should disappear behind the sail now and then, but it has to be flying slightly more than half of the time. If it stalls more, the sail is too closed and you suddenly lose the airflow from the whole sail and a lot of power.

When the breeze gets stronger and you need to get rid of some excess power to keep the boat going fast and flat, the windward luff telltales can be pointing more and more upwards. The top batten telltale should, of course, be flying aft all the time. In heavy conditions, forget the luff telltales, and just drive the boat flat and fast.



QUICK SUMMARY

Calm conditions

- It is essential to keep the boat going
- Slight leeward heel
- Sheet the sail open with the leech telltale flying enough, more than 50%
- Sheet very loose in the calm spots and tighten it when you get more wind
- Sprit quite loose, some wrinkles across
- Outhaul should be quite tight, to open the sail
- Luff loose, 2-3 turns on the boom preventer
- No tension on the vang when going upwind

Light breeze

- Sail for speed, and when you have more pressure go for height.
- Leech telltale flying at least 50 % of the time
- Be quite active with the sheet as the pressure in the sail changes
- Sprit is quite loose, some wrinkles across
- Outhaul looser in waves, tighter in flat water
- Boom preventer 2-3 turns
- Rake close to base value.
- No tension on the vang when going upwind

Medium breeze

- Now you start to sheet harder, and ease the sheet in the stronger puffs
- Vang on enough, so that the leech doesn't open too much when easing the sheet upwind in gusts
- Sprit tighter, but you should still see some small wrinkles appearing perpendicular to the sprit in gusts and when pumping with your body
- Boom preventer 1-2 turns
- Gradually tighten the outhaul as the wind picks up. In choppy conditions, have a loose outhaul.
- The rake may be more forward for better balance now

Fresh breeze

- Sail the boat flat
- Vang tight
- Outhaul tight
- Luff tight, no turns on the boom preventer
- Sprit loose enough, so that you have wrinkles perpendicular to it

Heavy weather

- Keep the boat flat and going
- Sheet the boom outside the corner
- Sprit very loose, ugly big wrinkle dividing the sail in two parts, depowering the sail
- Centerboard up 15 cm
- Weight back in the boat
(So, you can maybe rake the mast more back again, but it is important to have the helm light enough for steering and controlling the boat.)



Fig. Silja Lehtinen, Olympic bronze medalist.