

Tuning Guide for your Ullman 470 Sail

This guide will provide you with the basics of tuning a 470. Settings may vary on your sailing style, crew weight and your sailing conditions. We strongly recommend you experiment and find out which settings work best for you.

The recommended rig tensions for Ullman 470 sails are extremely tight and should only be used on new boats of suitable construction. If you are unsure of the condition of your boat, try using the same mast settings, but with a lower shroud tension. This will preserve the life of your boat.

The optimum crew weight is approximately 275 pounds. The ideal situation is for the majority of the combined weight to be the trapeze crew. There are many successful teams, however, sailing as light as 260 pounds and as heavy as 320 pounds.

It is very important to keep the boat at the class minimum weight. This is more important than the age of the boat. Older boats can be fast if set up properly. A prime example is a 1983 boat winning the 1995 World Championships.

The 470 is very sensitive to wind and sea conditions. Optimizing your 470's performance requires considerable adjustments in mast rake and tuning. This tuning guide will describe how to set up your boat, mast, and sails for the following sailing conditions:

Condition	Description
Drifting	0 to 3 knots
Underpowered	3 knots to both crew on the windward rail
Powered	Both crew on the windward rail to trapezing and keeping the boat flat
Overpowered	Trapezing and not keeping the boat flat

Boat & Rig Set Up

Centerboard Position

The pivot bolt should be placed in the maximum aft and at the maximum lowest point per the class rules. The bottom leading edge of the board should be 6 inches forward of perpendicular to the keel line, max down, up to 12 knots of wind. In 13 to 17 knots, raise the board 1.5 inches to make the boat easier to plane upwind. In 18 knots, raise the board 3 inches so the leading edge is perpendicular to the keel line. As the wind and waves increase, continue raising the board to keep the boat sailing efficiently and easy to steer. Over 24 knots, the sails can not be depowered any more and the board is the only depowering tool. The centerboard could be up as much as half way in huge breeze.

Mast Step

Place the mast step in the center to maximum aft in the boat per the class rules. Andreas Kosmatopoulos places his Superspar M7 mast step 7 feet and 1/2 inch from the center of the centerboard bolt. Morgan Reeser places his mast step maximum aft in his boat with a Superspar mast.

Set Up for Epsilon, Z Spar, Needlespar & Goldspar Masts

For all the following measurements, be sure the rig tension is on, the mast puller is loose and the spreader deflection is set at 5 inches.

Rig Tension

The rig tension is measured on the 1/8 inch diameter luff wire with a LOOS Model A tension gauge. The tension gauge should read 36 (390 lbs.) for all of these measurements. Only use this much tension on newer boats. If your hull is older, try using 33 (320 lbs.) or less if the hull deforms.

Mast Rake

The mast rake is measured by attaching a tape measure to the main halyard and pulling it to the top. Use the halyard lock to set the halyard. Measure from this locked position to the top center of the transom. In drifting conditions the mast rake is 22 feet 2 inches. As the wind increases, rake the mast aft in four increments; 22 ft. 1/2 in., 21 ft. 11 in., 21 ft. 9 1/2 in. and 21 ft. 8 in. Raking aft helps depower the boat.

Spreaders

The length of the spreaders is measured from the side of the mast to the center of the shroud where it intersects the spreader.

Mast	Spreader Length
Proctor Epsilon	18 1/4 inches
Needlespar	19 1/2 inches
Z Spar	19 1/2 inches
Goldspar	19 1/2 inches

The fore and aft deflection is measured from a straight line between the two spreader tips to the aft face of the mast track.

Drifting & Underpowered	
Mast	Spreader Deflection
Epsilon	5 1/2 inches
Needlespar	5 3/4 inches
Z Spar	5 3/4 inches
Goldspar	5 3/4 inches

Powered	
Mast	Spreader Deflection
Epsilon	4 1/2 inches
Needlespar	5 inches

Z Spar	5 inches
Goldspar	5 inches

Overpowered	
Mast	Spreader Deflection
Epsilon	5 1/8 inches
Needlespar	5 3/4 inches
Z Spar	5 3/4 inches
Goldspar	5 3/4 inches

Mast Set Up For Superspar M7 Mast

The M7 mast is a very forgiving mast and one we set up differently than the other masts. We recommend using three shroud pin settings for the different wind conditions. The spreader length is 18 1/2 inches and the deflection is set to give the mast 3 1/2 inches of pre-bend. This pre-bend is measured by holding the main halyard tight against the mast at the goose neck fitting and measuring from the main halyard to the aft face of the mast track at the spreaders. The mast should always maintain this same 3 1/2 inches of pre-bend in each shroud pin setting.

Drifting & Underpowered		
Rake	Tension	Pre-Bend
22 ft. 1 in.	33 (320 lbs.)	3 1/2 in.
If the wind increases during the race, Tension will be lower, but this is OK. Ease the jib halyard till the rake is 21 ft. 11 in.		

Powered (12 Knots)		
Rake	Tension	Pre-Bend
21 ft. 10 1/2 in. Drop the shroud pin	33 (320 lbs.)	3 1/2 in.
You will have to go one hole down to maintain tension. Move the spreaders forward at this rake to maintain the same pre-bend.		

Overpowered (17 Knots)

Rake	Tension	Pre-Bend
21 ft. 8 in. Drop the shroud pin	33 (320 lbs.)	3 1/2 in.
Move the spreaders forward.		

Mainsail Trim

Mast Puller

The mast puller controls the lower mast bend. The puller's position is balanced with the pre-bend to control the depth of the Ullman RFM (Really Fast Mainsail). Place a dark, vertical mark on both sides of the mast at the partners. Draw a scale with 5/8 inch increments on the tops of the partners to use with the vertical lines on the mast. Number these marks with "0" being neutral and forward are positive numbers and aft are negative numbers. You can use these marks to remember puller settings and when comparing settings with your tuning partners.

Condition	Mast	Mast Puller Tension
Drifting	Epsilon/Needlespar/ Z Spar/ Goldspar	None. 0 to +1
spacer	Superspar M7	None (push the mast forward so it sticks in the partners and the mast has 4 1/2 inches of pre-bend. 0 to +1
Underpowered	Epsilon/Needlespar/ Z Spar/Goldspar	Neutral ("0" Mark)
spacer	Superspar M7	0 to -1
Powered	Epsilon/Needlespar/ Z Spar/Goldspar	Maximum

spacer	Superspar	-1 to -2
Overpowered	Epsilon/ Needlespar/Z Spar /Goldspar	Ease from maximum as needed to depower
spacer	Superspar	-2 to -1

Boom Vang

Do not use the vang upwind until the boat is overpowered. Keep enough tension on the vang to keep the boom from going up when the mainsheet is eased. The vang should be set so the top leech telltale is stalled 35% of the time until the crew is flat out on the trapeze. As the wind increases and the crew is flat out, continue tensioning the vang to maintain leech tension and bend the mast to depower the rig.

In very windy conditions, once the sails have been fully depowered and the centerboard raised, the vang will have to be eased to keep the boom from going to far outboard. Ease the vang slightly and this will allow you to pull the boom in closer to centerline. This technique increases pointing and reduces the backwind in the mainsail.

Mainsheet/Traveler/Bridle

Drifting conditions. Use enough mainsheet to keep the top batten telltale flying. The traveler/bridle should keep the boom as close to centerline as possible.

Underpowered and Powered Conditions. The top telltale should be stalled about 35% of the time. Keep the boom as close to centerline as possible with the traveler/bridle.

Overpowerd Conditions. Use the mainsheet to depower the boat and the vang to keep leech tension. The traveler/bridle is set in the center and left alone.

Use the vang to keep the top batten parallel to the boom when sailing downwind.

Cunningham/Downhaul

The cunningham controls the fore and aft draft position in the mainsail. For the Epsilon/Needlespar/Z Spar/Goldspar masts, use the cunningham to pull the draft forward as the wind increases, just enough to remove the luff wrinkles.

The cunningham on the Ullman M7 main and the Superspar mast may be one of the most important adjustments. Since the top section of the Superspar mast is so flexible, the cunningham can be used to power and depower the main. When you need to depower the main quickly, pull on the cunningham hard to bend the top of the mast and flatten the top of the mainsail. If you sail into a lull and you need power quickly, ease the cunningham and instantly power up the top of the main. This technique is very similar to using the downhaul on a catamaran. Add a 6:1 purchase to the cunningham so you will be able to play it easier.

Outhaul/Tack Line

Use these two adjustments to control the depth in the bottom of the mainsail. Keep the outhaul tight in most conditions when sailing upwind. In light air and chop, ease it one inch to give the bottom of the main some depth. Ease the outhaul two inches when sailing downwind to open up the shelf foot.

Adjust the tack line to keep the front of the sail smooth. It is used in conjunction with the mast puller to add and reduce depth in the bottom of the main. Pulling the tack forward makes the main fuller and letting back makes the main flatter.

Jib & Spinnaker Trim

Ullman Sails offers a lot of different jibs. The trimming principles below apply for all types of Ullman jibs. Each jib will have slightly different lead and sheet positions.

Jib Cunningham/Downhaul

Set the jib luff tension so the luff wrinkles are just barely removed. This means increasing tension as the wind increases.

Jib Sheet Tension

The jib sheet must be balanced with the jib lead position for proper set up of the jib leech. Mark the splash rail on the boat with three marks to reference trimming the foot of the jib. The three marks are located in the positions listed below.

Position 0 = 1 ft. 7 5/8 inches from the rail. (measured parallel to the splash rail)

Position 1 = 1 ft. 6 1/8 inches from the rail.

Position 2 = 1 ft. 4 5/8 inches from the rail.

Position 0 = drifting to powered, but not easing the main.

Position 1 = powered to easing the main slightly.

Position 2 = overpowered; planing consistently.

In very windy conditions ease the jib sheet more to minimize backwinding in the main.

Jib Lead Athwartships Trim	
Condition	Lead Position
Drifting	5 inches inboard from the tank to the center of the jib block
Underpowered	2 to 3 in. inboard
Powered	2 to 3 in. inboard
Overpowered	Against the tank, maximum outboard

Fore and Aft Trim or Up and Down Trim

As mentioned above, the lead is a balance with jib sheet tension to set the proper leech trim. We recommend placing a telltale in line with the top batten 7 inches aft of the luff. This allows you to gauge the twist without looking to leeward. The upper telltale should always break before the lower jib telltales.

Set the jib lead so the top batten on the jib is twisted 10 degrees to leeward of centerline of the boat. As the wind increases, the jib twist must also increase to minimize backwinding the mainsail. In all but the most overpowering conditions, the 470 should be sailed with as little backwind in the main as possible. No backwinding is ideal. This is accomplished by easing the jib sheet and easing the jib lead up or aft as the breeze increases. In overpowering conditions, the top telltale should be lifted all of the time when you have the proper amount of twist.

Spinnaker Trim

The pole height should be set nearly horizontal on reaches. Set the pole much higher on broad reaches and runs to keep equal clew height. Play the guy and sheet constantly to keep the chute flying.

Please feel free to give us a call or e-mail at Ullman Sails San Diego to discuss sailing, ask questions, or order a new sail. We are here to help you achieve your sailing goals.

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