

Note: Opinions are my own. After writing these instructions I understand why no-one has not done it before. Everything depends on mainsail cut so detailed instructions can not given and generalized instruction are found from every trim book. These (and the longer version in Finnish) are notes that I have written. Later I will add some pictures to clarify. I wellcome all corrections, hints, changes, ideas. Corrections for my English is also wellcome!

The ultimate rig trim guide for X-95

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Good rig trim is basic requirement for good sail trim. Correct sail trim can be found from many sources. Good rig trim makes the sail trim adjustments partly automated e.g. flattening the top of the main with increasing wind. Automatic trim is fast.

Rig trim

Depends on main sail cut - these instructions holds(?) for WB-sail sails, that needs a quite large prebend. There must be a lot of rake in the mast. The optimal value is unknown, but it is more than 5%, maybe 6%. The large amount of rake is needed because it is the only way to make a good prebend for the mast. The mast should be fixed as forward as possible in the mast collar.

Upper shrouders should be tight (15% of breaking load, see e.g. Dedekam). Intermediate shrouders should be quite loose, and the lowest ones are a bit more tight. This allows smooth mast bend when the backstay is tensioned. Accurate values depends on your mainsail cut. This helps the rig to be "selfregulating", the upper part of main will spill the wind with increasing wind. Lower and intermediate shrouders at leeward side are getting loose when true windspeed > 7 m/s.

The "loose" intermediates are beneficial in three ways in increasing wind:

- tip of the mast bends to leeward
- middle of the mast bends to windward opening the slot
- mast bend by backstay is possible.

Genoa is usually sheeted to 5 cm from spreaders and when accelerating 30 cm from spreaders.

Main is kept flat and hard sheeted. It is not a problem if the uppermost telltale does not fly but breaks behind the sail. The main has always more camber aloft than alow. Eased outhaul makes the sail very difficult to control. It is better to have tight outhaul and good control over the whole sail than the last percentages of power but poor control of the sail.

Suggested table of sail trim is at the end of document.

The point is that backstay is always tensioned. Only when there is optimum wind, 5-6 m/s, it can be eased. The problem with main is that the uppermost telltale breaks behind the sail when there is less than 6 m/s of wind. If the breaking of the telltale is tried to prevent only by means of traveler, most of the mainsail loses the power and the slot between sails closes, and as a consequence, neither the genoa drives well. So it is better to let the telltale break than to lose all the power.

The mainsail has only a limited amount of twist with traveler. The strength of the sailcloth limits this. For this reason, more twist must be found by flattening the sail. The bending of the mast limits the control of the upper parts of the main. If the mast is bended too much there are wrinkles from the end of the boom to the mast and the control of the sail aloft of this point is lost. This should be prevented.

The mast bend controls the camber. The more the mast is bended the flatter the main. The mast bend must correspond to the sail cut at all heights. This is same thing as closing the leech. The arc of the camber ends at some point - and it always ends to "closing of the sail". For this reason, check the arc of the leech, is it smooth from boom to aloft, opening a bit, but never closing more aloft than allow. Adjust the lowers and intermediates if the curve is not smooth.

Use checkstays to prevent too much mast bend. In light conditions straighten the pre-bend by checkstays.

Double or quattro check that your mast is vertical to deck (side by side). Hire laser-instruments or use steel tape or use some other reliable method, but you will avoid many trim problems if your mast is absolutely vertical.

Summa summarum. Make the needed twist by flattening the sail and not by moving traveler more and more windward. 10-20 cm windward is enough. Have always some tension at backstay when sailing to provide good smooth mast bend.

X-95 does not need maximum power of the sails when sailing upwind. You gain 0.2 kn speed by flattening the sails from "maximum camber until heeling too much" .

Bottom smoothness.

Grind from bow to the end of keel with P1200 wet paper, behind from that point P600 is enough. Keel and rudder must be extremely smooth and fair. The leaving edge of both should be knife-sharp.

note: 2 kn ~ 1 m/s

wind strength [m/s]	0-3		3-5		5-8		8-	
waves	flat	rough	flat	rough	flat	rough	flat	rough
genoa allow	ave	min	ave	max	ave	ave	min	ave
genoa aloft	max	max	ave	max	ave	ave	min	ave
twist	max	max	min	ave	min	ave	ave	max
draft posit %	40	38	40	38	42	40	44	42
main allow	ave	min	ave	ave	ave	ave	min	min
main aloft	ave	ave	max	max	ave	ave	min	min
twist	max	max	min	max	min	ave	min	ave
draft posit %	48	48	48	50	50	50	52	52

min – minimum draft or twist

ave – average draft or twist

max – maximum draft of twist

trimming methods:

halyards & cunningham – draft position

sheet – twist

traveler & sheet – twist

runners - genoa aloft

sheeting point – genoa allow

checkstays – main in the middle

backstay – main aloft and middle

And if you don't win with these instructions, Don't blame me – me neither! And if you do well, let me know and send a picture of your boat and sails. If you are wealthy hire me for your America's Cup project.