

## 420 Tuning guide

*Prepared by Rob Wilson, ex 420 National coach, 420 Nationals Champion and 420 Youth Champion.*

This guide is designed as a basis to get the best out of your North sails. In addition to the details below keep a tuning diary and record fast settings to insure that you get the best from your equipment.



### **Mast Step**

Measured from the inside of the transom to the back of the mast 2830 mm.

### **Spreaders**

The spreaders are the key to setting up the right amount of pre-bend in the mast. Time should be taken to get the right pre-bend settings for your mast. The best way to measure this is to run the halyard from the tip of the mast down to the black band at the bottom of the mast. Then at spreader height measure the distance from the back of the mast to the closest edge of the main halyard.

This should be done with rig tension on, mast rake at base setting (19°11 ½, tension 30), and no chocs.

Spreader length 470mm

Pre-bend Superspar M7 – 45mm (+-5 depending on weight)

Pre-bend Kappa – 40mm (+-5 depending on weight)

*\*Pre bend depends massively on your crew weight, as as soon as they go on the wire they will bend the mast substantially. If you are a slightly heavier team reduce the pre-bend slightly and if you are lighter, finding yourself getting overpowered early increase the pre-bend slightly.*

**Mast Rake/ Rig Tension**

Mast rake is measured by attaching a tape measure to the main halyard, hoisting it to the top of the mast and then measuring to the back of the transom with the rig tension on and NO Chocks. To insure the tape measure is pulled to the same place every time, take a measurement from the tip of the mast to the black band.

Rig tension is measured off the shrouds with either a Superspar or new Loos tension meter, Superspar meter being the first figure and Loos being the second.

Wind Speed	Mast Rake	Rig Tension
2-6 Knots	19'11 1/2"	29/29
7-11 Knots	19'10"	29/29
12-16 Knots	19'8 1/2"	30/30
17-23 Knots	19'7"	30/30

*\*As a rule, once the boom is going out of the back quarter, it is time to rake back to your next setting, this will be earlier for lighter teams*

*\*\* Get the above setting and note shroud position and tension on mast.*

**Chocks**

Ideally carry 3 x 15mm chocks and one half choc.

The chocks are the major adjustment for controlling pre-bend on the water, and the amount of power in the rig. Placing chocks in front of the mast will decrease the amount of pre-bend and increase the power in the sail. If you place too many chocks in front of the mast you will find the mainsail leech will become very stalled, so remove chocks.

In very light winds, especially in flat water, you want to flatten the mainsail helping airflow over the sail, back chocking (placing chocks behind the mast) can help this. Back chocking has an amazing effect up the whole mast.

Back chocking can also help to stop the mast from inverting when reaching.

Wind Speed	Chocks	Back Chocks
2-6 Knots	0	1 to 2
7-11 Knots	1 to 2	0
12-16 Knots	2 to 3	0
17-23 Knots	2	0

**Kicker**

In light winds pull just enough kicker to take up the slack in the system, the kicker should not be applying any tension to the leech, or you will lose power and close the leech. As the wind increases and you have to start easing the main (when the crew is flat wiring) add enough kicker so that when the mainsheet is eased leech tension is not lost. As the wind increases and the boom is constantly away from the centre-line use enough kicker to control the leech. The sail should not be allowed to twist too much or pointing will be lost and the boat will become hard to control.

**Cunningham**

This should only be used as the boat starts to get overpowered. When it is very windy pull the Cunningham hard.

**Outhaul**

The outhaul should be left relatively tight at all times apart from very choppy conditions where looking for more power.

Wind Speed	Kicker	Cunningham	Outhaul
2-6 Knots	eased	eased	tight
7-11 Knots	remove slack	eased	Ease approx 2cm in chop
12-16 Knots	Control leech tension	remove creases as over powered	tight
17-23 Knots	Control leech tension	pull harder as more overpowered	tight

**Mainsail Leech Tension**

Use the leech tell tales to indicate how much mainsheet tension should be applied. Most of the time look for the tell tales to be flying about 90% of the time.

**Mainsheet Strops**

It is critical to get the boom as close to the centre-line in light to marginal winds. This means careful adjustment of the strops and marking them. If the boom is off the centreline then pointing will be lost.

With the new strop system, in very light winds, especially in chop it is possible to get the boom slightly to windward.

**Top Batten**

In light air push the top batten in lightly. In medium winds more firmly to insure the creases are removed.

**Centreboard**

In very light wind the centre board can be raked very slightly forward. As the wind increases set it to vertical (mark) and then as the boat starts planning begin to rake the plate back.

## Jib Settings

Sheeting the jib correctly has a major effect over the boat speed of a 420. Therefore it is important to mark the jib sheets to insure that fast settings can be repeated.

Tie the boat to the trolley and place on a beat. Sheet both the main and the jib and look at the slot from behind. Look to get the slot parallel all the way up between the mainsail luff and jib leech.

Make sure the jib is in tight, then ease it one inch and pull the windward jib sheet (barberhauler) on quite hard and cleat it. Doing this pulls the clew inboard around 3 inches and creates a more efficient slot shape. With a waterproof pen, mark the jib sheet and barber hauler so that these settings can be referred to once afloat. These will not be the exact positions you want to sheet the jib to, but means that fast settings can be reproduced once found.

### Jib Height

Set the jib on the forestay so that the foot of the jib is just touching the deck when jib Cunningham is applied.

### Jib Cunningham

Pull the jib Cunningham just enough to remove the creases on the luff of the jib. When the wind is very strong tighten this as you would with the mainsail (note you do not have to pull as hard).

## 420 Technique

- Light winds – flatten the sails, long strops to centre line the boom, keep the leech telltales flying as much as possible. Crew nice and low on the leeward side out of the slot.
- Medium wind, just beginning to ease sheet. The crew should work very hard here to keep the boat flat so that the helm does not have to ease the mainsheet and loose leech tension unnecessarily.
- Strong Wind – Work the mainsheet hard at all times and keep the boat flat. If the mainsheet is constantly going out of the back quarter then either rake back or raise the centre board.