NORTH SAILS

One Design

For any question you may have on tuning your Lightning for speed, contact our Lightning experts listed below:

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Lightning Tuning Guide

Introduction to Tuning, Trimming and Racing your Lightning

Proper boat speed depends mostly on constant and consistent adjustments to your rig and sails. The following measurements are those we have found to be the fastest settings for your new North Sails. We have included information on both the tuning of the M-5 and the Fisher design sails. The M-5 is a more backstay sensitive sail, which sails fastest when the blocks and the lower shrouds are adjusted corresponding to the change in conditions. The Fisher mainsail responds best to mainsheet tension with less emphasis on adjustment to the backstay, the blocks and the lower shrouds.

Both tuning techniques have proven to be very fast and we're confidant that through following the basic numbers we offer in this tuning guide you'll find top speed in all conditions. However, as always, your North Lightning team is anxious to help you any way we can. Feel free to call or e-mail us anytime! Good luck and good sailing!

North Sails One Design

In our new tuning guide we have divided the Fisher and the M-5 tuning procedures. You will notice after we describe marking your headstay, placing the butt of your mast and setting the length of your headstay, that the **M-5 Tuning System** is listed step by step followed by the **Fisher Tuning System**. Note that the techniques used in setting both systems are quite different. Please check it over carefully!

All of your North Lightning representatives are comfortable with the tuning for both techniques. Should you have any questions about either style, we urge you to call us. We are always happy to help you.

The Steps in Tuning

The tools necessary for properly tuning your boat are a 50 foot tape measure, a small Loos tension gauge (the Model A pictured right or the newer PT-1) and a permanent marker.

Note: *While the newer PT-1 black spring-loaded Loos gauge is very consistent and works great for checking the shroud tension on your uppers and lowers, we have not yet been able to use it successfully for the tuning process for the tuning for the* ***M-5 tuning system****. It is important to be able to "zero" the forestay in order to set the proper lower tensions for the various conditions. However, with the Fisher Tuning System either gauge will work fine.*

1. MARK YOUR HEADSTAY.

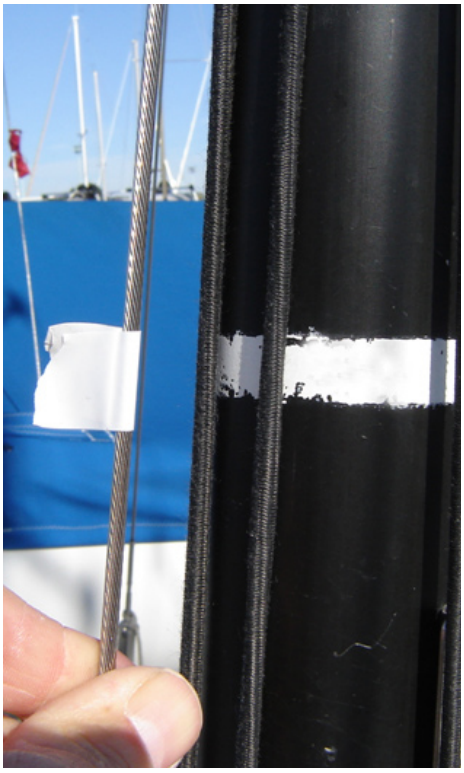
Lay the forestay along the front of the mast and mark where it is even with the top of the mast band at the gooseneck. This can be accomplished with the mast on the ground or stepped with the uppers attached. (See picture on the right)

2. MAST STEP POSITION

For the **M-5 Tuning System** we suggest placing the butt of the mast at maximum forward (the aft edge of the butt of the mast should be 21 5/8" forward of the center of the centerboard pin).

For the **Fisher Tuning System** and for Allen boats we suggest placing the butt at maximum forward. For the Nickels Boats (both the newer (after 15200) and older) we suggest moving the butt aft one hole in the channel.

For any boat having difficulty developing the proper prebend (or with the upper shrouds further aft (such as the Carson or Lippincott) we suggest moving the butt of the mast aft as much as 3/8" to 5/8". For the Carson and Lippincott hulls the butt measurement should be only 20 1/4" forward of the pin.



3. ADJUST THE HEAD-STAY LENGTH
(Refer to the table below)

Hook up your headstay and measure from your mark that was determined in Step 1 of the tuning guide to the intersection of the stem and the deck. Adjust your turnbuckle so that it measures as follows:

HEADSTAY TABLE		
M-5	Nickels	44 1/2"
	New Allen	45"
	New Nickels	45"
Fisher	Nickels	44"
	New Allen	44 1/"
	New Nickels	44 1/2"

Measure from the top of the mark on your forestay to the joint of the bow and your deck to set your forestay length.

The M-5 Tuning System

INITIAL SET-UP

1. Allow your mast to lean fully back on the forestay with no shrouds attached or mast blocks in place. Mark your deck on both sides directly across from the front of the mast. This is your **"0" datum point** and the point that will determine your mast blocked position in light, medium and heavy winds.

2. Attach your upper shrouds to the forward chain plates and tension them to the class maximum of 250 pounds. Do not attach the lowers or be sure that they are very loose.

Note: *It is important that the mast is straight in the boat and not leaning or bowing to either side. To verify this, hook a tape measure to the jib halyard. Measure to the chine below the upper chainplate on each of the boat. This measurement should be within 1/4" on each side and can be adjusted by adjusting the turnbuckles on either side.*

3. Attach the lower shrouds to the aft chainplates and tighten them until they are just barely hand tight. Check that the mast is still straight laterally by sighting up the back of the mast. This adjustment to the lower shrouds is just initial tuning and will be adjusted later once the blocks are placed at the partners.

M-5 LIGHT AIR SET UP (0 - 6 MPH)

A. Place your mast blocks behind your mast until the forward edge of the mast is 1 1/4" forward of your "0" datum point for the Nickels and 1 1/2" for the Allen.

B. Pull your backstay until the forestay just registers "0" (using the Model A Loos tension gauge).

C. Adjust your lower shrouds equally until they are "0" on the Model A Loos gauge. (If you are sailing in wavy conditions where there is more chop than the wind should warrant, we suggest tensioning your lowers up to 5 or 6 for increased power.)

D. With the backstay set as in step B, mark your backstay where it exits the deck at the transom. Ease the backstay tension off until this mark is 5" above the deck on the Nickels or 7" on the Allen. Mark this position. Use this mark (5" for the Nickels, 7" for the Allen) for your very light wind backstay setting when the mast is pre-blocked forward as in Step 1.

Note: Without the proper backstay tension in light winds the mast will lean much too far forward and there will be too much headstay sag. An overabundance of jib luff sag will result in the jib leech hitting the spreader and the shroud no matter how it is trimmed. The backstay is just tensioned to remove enough sag to keep the jib leech off the spreader and the shroud when the upper batten is angling just at the end of the spreader.

M-5 MEDIUM WIND SET UP (7-15)

A. Block your mast forward of the "0" datum point 1" for the Nickels and 1" for the Allen.

B. Tension your backstay until the forestay just barely registers "0" with the Model A tension gauge.

C. Set your lower shrouds equally at 10 for the Nickels and 18 for the Allen.

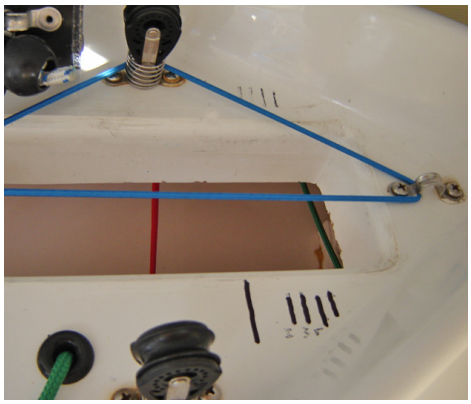
M-5 HEAVY WIND SET UP (16 + MPH)

A. Block the mast 3/4" forward of the "0" datum point.

B. Pull your backstay until the forestay just registers "0".

C. Set your lower shrouds equally at "14".

D. Use lots of backstay when you're sailing to keep the boat flat!



Mark your deck for your 0 datum point, light, medium and heavy wind mast block settings with the M-5 tuning system.

The Fisher Tuning System

A. Set your upper shrouds at 250 lb. Tension with the lower shrouds tensioned to 80lbs.

Note:* Important!!** *This initial shroud setting with the Fisher tuning is different than the Lightning Class maximum shroud tension measurement. Be sure to set the uppers at 250* ***while *the lowers are set at approximately 80lbs.*

B. Push the mast forward in the partners and place nearly all your mast blocks behind the mast until the lower shrouds read close to 250-300lbs (**see below**).

It will require a great deal of pressure to push the mast far enough forward to induce the necessary 1 3/4" to 2" of positive prebend in the mast at the spreaders. To check this pull your main halyard down and hold it up against the back of the mast at the gooseneck. The distance from the taught halyard wire to the back of the mast at the spreaders should be very close to 1 3/4".

Note: *With the later model Nickels and Allen boats usually the proper prebend will be reached while a ½" block is placed in front of the mast at the deck. On the Allen and newer Nickels the lowers shrouds will read 300lbs when set properly to achieve the necessary prebend. For the older Nickels and boats with the upper shrouds aft the lowers will be tensioned to 250lbs.*

Usually a 1/2" block will be in place in front of the mast with the Fisher tuning with the New Allen and New Nickels boats.

C. Verify that your lower shroud tension has now increased to 250-300 pounds. If your lower shroud tension is too light, chances are you will not induce the proper prebend. Increasing the lower tension will help achieve the prebend.

At this point, because the mast has hopefully developed the prebend discussed above, the upper shrouds will drop in tension to 160-190lbs .

Note: Important!! *Do not re-tighten the uppers above 190lbs. This reduced tension is necessary for proper mast bend and is indicative that you've developed proper prebend.*

Note: *It is important that the mast is straight in the boat and not leaning or bowing to either side. To verify this, hook a tape measure to the jib halyard. Measure to the chine below the upper chainplate on each of the boat. This measurement should be within 1/4" on each side and can be adjusted by adjusting the turnbuckles on either side.*

D. Hoist your 50' tape measure on the main halyard and latch it in your lock. Check the measurement from the top of the mast to the intersection of the transom and the rear deck without the jib up but the proper prebend and rig tension as indicated above. Do not pull hard on the tape- take the measurement with the rig "relaxed. The rake should be close to 26' 7" for the Allen and newer Nickels Boats. For the older Nickels the rake should be 26'6". For the Lippincott/Carson boats this number should be at 26' 3" to 26' 4".

Note: *If your rake measurement is farther forward than the numbers listed above (more than l/2"), then consider pulling a small mast block (¼" increment) from behind the mast and re-tensioning the lowers to 250 pounds. Replace the block at the front of your mast and recheck that your prebend is the necessary 1 3/4". Your mast should also have raked farther aft so that the rake number is smaller.*

E. Without applying tension on the tape measure (as described above) record the measurement at the transom. Now grab the backstay and pull until the slop in the forestay is just barely eliminated (not when

the Loos gauge reads "O"). The change in your rake from the backstay pulled on to the backstay relaxed should be 3" to 4". If this measurement is more than 4", pull a small block from behind the mast and retention the lowers to 250-300 pounds (as described above). If the "rake change number" is less than 3", place another small block behind the mast and ease the lowers off until they read the proper tension. This will allow the entire mast to tilt (rake) slightly farther forward.

F. Re-check your lower shroud tension side to side by sighting up the back of the mast to be sure the mast is perfectly straight laterally. Loosen and tighten the opposing sides until the mast is straight from the deck to the hounds, always maintaining the proper lower tension and prebend

Once on the water double check your lateral straightness once again when sailing upwind in an 8 - 0 m.p.h. breeze.

Note: *In breeze above 10-12mph the upper sections of the mast above the spreader will fall off slightly sag to leeward. This is normal.*

CONGRATULATIONS! You have completed all the tuning with the Fisher setup. You will never need to adjust your lower shrouds or blocks until you take your mast down. When re stepping simply place everything back where you had it last!

Jib Trim

JIB HALYARD TENSION

M-5 TUNING SYSTEM

Generally set your jib halyard tension so that the jib luff wire (in the front of the jib) is just equal tension wise with the forestay when sailing upwind (There should be no sag in between the snaps.).

FISHER TUNING SYSTEM

In all conditions set the jib halyard tension so that the luff wire is just slightly tighter than the forestay in all conditions. The forestay will actually show a slight "snake" between the snaps. From light to heavy winds this will mean an adjustment of nearly 2 1/2". In very heavy winds jib halyard stretch will make it difficult to set the halyard tighter than the forestay. More tension on the halyard will be necessary.

JIB CLOTH TENSION

FOR BOTH (JF-2 AND 5-A+)

In light winds the cloth tension will be set loose enough that there may be slight wrinkles along the luff. As the breeze increases, increase the cloth tension until all the wrinkles are barely removed in heavy wind.

In very heavy winds pull the jib cloth tension a little tighter than just barely removing the wrinkles in order to flatten the sail and help open up the upper batten.

In breeze, set your jib cloth tension so the luff is smooth.

LASHING AT HEAD OF JIB

Each North jib has the luff wire attached to the head of the jib with a light line lashing which allows the height of the jib to be adjusted on the luff wire. Depending on the type of tack fitting on your boat, you may want to adjust this lashing to raise or lower the jib to sit on the deck properly. If the skirt of the jib is not laying on the deck approximately 1 1/2" to 2" (or the jib tack is higher than 3 1/2" off the deck) you may want to loosen the lashing and allow the jib to slide down closer to the deck. Be sure to tie well, or even tape, the lashing when done to prevent the lashing from coming untied.

Don't be afraid to adjust your jib head lashing so there is nearly 2" of jib skirt laying on the deck when sailing upwind.

JIB LEAD POSITION

Your North jibs are marked with a trim line near the clew drawn from the clew grommet toward the body of the sail. Your lead should be positioned so that the sheet is a direct extension of this trim line. This is more effective than a measurement from the stem to the lead position because of the variances in jib lead fittings and placement, rake, and jib wire height off the deck. Generally you should set the lead in

this direct extension position unless the boat is overpowered when the lead may be moved aft as much as 2".

Set your jib lead in most conditions so the sheet is an extension of the trim line drawn on the clew.

JIB SHEET TENSION

Normal jib sheet trim for 8 - 12 m.p.h. and flat water for the 5-A+ and the Fisher jibs would be 2" - 3" inside the spreader tip. In winds below 8 m.p.h. or when trying to accelerate, leaving a tack, etc., the sheet will be progressively eased out until the top batten is angled even out past the end of the spreader for both jibs. In extremely light winds it is advantageous to actually hold the clew of the jib up so the upper batten angles 1" outboard of the tip of spreader.

In heavy winds above 15, it may be necessary to ease the jib sheet to the point where the batten might be angled 1" or more past the end of the spreader. Some sailors, and especially those sailing the 5A+ jib, have had success trimming the sheet much harder.

However, with any jib, in any condition, the best final check on jib sheet trim is that the jib leech telltale is flowing all the time. To aid in setting up the trim for your North jibs, we suggest placing rings of tape on your spreaders 1" and 2 1/2 " in from the tips of the spreaders..

Mainsail Trim

Mark your spreader for easier jib trim, BUT check that the telltale on the leech at the top batten is always streaming.

MAINSAIL OUTHAUL

Your North mainsail is constructed with a shelf foot. Judge the outhaul tension at the center of the boom . The seam which attaches the shelf foot to the sail, the bottom seam in the sail) gets closer to the boom when the outhaul is tensioned or further away from the boom when the outhaul is eased.

At maximum outhaul tension this seam will lay next to the boom and the shelf foot is closed up. This is proper trim for heavy winds when the boat is overpowered. In light winds the center of this seam should be 1" to 2" from the boom. We do not feel it is advantageous to loosen the outhaul more than this when sailing upwind. Downwind loosen the outhaul to allow the shelf foot to open completely. This should place the clew of the main nearly 3" in from band at the end of the boom.

CUNNINGHAM TENSION

In light winds the Fisher mainsail performs best with the Cunningham completely slack. There should be nearly 8" wrinkles perpendicular to the luff from head to tack. On the M-5, the cunningham will be tensioned so that wrinkles are only evident below the spreader window.

Use the shelf foot seam as a guide for outhaul tension.

In medium winds the Cunningham should be tensioned on both mains so that wrinkles should be evident just in the bottom of the mainsail below the spreader window.

In heavy winds, it is beneficial to pull in the Cunningham fairly aggressively. At the same time that the backstay is applied to de-power the main, the Cunningham should be pulled on to maintain the proper draft position.

BACKSTAY

Too much backstay tension will create over bend wrinkles above the spreader window. Ease the backstay until they just disappear.

The backstay controls mast bend and headstay sag. Pulling it harder flattens both the main and the jib. It also changes the main leech tension and the angle of upper batten of the main. In very light winds when the mast is blocked forward and pre-bent (see mast blocking) tension the backstay slightly to keep the headstay from sagging (and bouncing) too much. In heavy air more backstay is necessary to flatten the main. If you pull the backstay too hard, the main will invert as evidenced by large diagonal wrinkles running from the upper area of the main above the spreaders down towards the clew. See picture below.

Ideally, over bend wrinkles will fall just below the spreader window and halfway back on the boom when proper prebend and mast bend is achieved.

In medium to heavy winds, some inversion wrinkles below the spreader window are normal and actually desirable as they indicate that maximum mast bend has been achieved. See picture on the following page.

As a basic guide, for the mainsail to take shape and the upper batten to be trimmed parallel to the boom (see mainsheet trim), the backstay should be applied to just barely remove the slop. Once all three crew are on the high side and beginning to hike, the backstay should be tensioned much more tightly. As the boat hits waves or sails into lulls, be sure to ease the backstay to power the rig back up.

It is also important to remember that as you pull on more backstay you must also pull on a proportion-ate amount of both jib cloth and main Cunningham. These three controls working in harmony are the best way to keep your sails performing at their designed best shape.

THE MAIN BRIDLE TRAVELER

The bridle is considered a "rough" adjustment for setting the balance of your helm. The bridle is normally centered for light to medium winds, but as the boat starts to heel and becomes overpowered, and therefore develops more helm, the bridle should be eased to leeward. Do not ease the bridle to leeward until the outhaul is fully tensioned and moderate tension has been applied to the backstay.

If you have a bridle that is adjustable in height, it is advantageous to raise the bridle for light winds so when the main is sheeted properly (upper batten parallel to the boom), the top of the bridle block should be fairly close to the block on the end of the boom. In medium winds

above 6-8 mph, the bridle should be approximately 11" to 12" above the deck; in heavy winds, the bridle should only be 9" above the deck. If your bridle is not adjustable, set it at 11" off the deck. The goal in setting the bridle is to position the boom within 2-3" of center line in light winds while still maintaining the proper upper batten parallel to the boom position described below. Often, it pays to moderately depower with the backstay, outhaul and Cunningham before easing the bridle.

MAINSHEET TENSION

Ease the main so the upper batten is angled out slightly past parallel to the boom when power or acceleration is needed.

The general rule is to trim the mainsheet to maintain the top batten parallel to the boom. This is viewed by sighting directly underneath the boom up towards the

upper batten. When power is necessary in light or choppy conditions or just after a tack it is important that the mainsheet is eased so that the upper batten is angled outboard (10 - 15°) from parallel to the boom.

Once up to speed, re-trim the main to upper batten parallel. In heavy winds, when maximum backstay tension is applied and the main is fairly flat, the upper batten will angle slightly outboard in relation to the boom. In drifting conditions where the weight of the boom will hook the upper batten, ease the mainsheet until the upper batten is parallel to the center line of the boat. The boom will be positioned well to leeward of center line, as much as 18". Be sure to recheck the top batten position whenever the backstay and Cunningham are adjusted.

Consider the mainsheet your throttle. It definitely helps to keep the mainsheet in hand and play it to keep the boat moving. When it starts to feel slow ease the sheet and when it feels fast try trimming in tighter to increase pointing ability. In other words, as long as it feels good, pull! When it feels ugly, ease it out.

Upwind in heavy air or very puffy conditions with **Fisher main**, the boom vang is tensioned so the mainsheet can be played like a traveler. Tension the vang in these conditions so the upper batten is angled outboard 10°. With this proper necessary tension the boom may actually show a bit of bend. Play your mainsheet to keep the boat flat and the helm balanced! Be sure to ease your vang as you round the weather mark!

With the **M-5 Main**, most of the main control is accomplished with careful balance between the mainsheet and traveler. However some sailors have had success tensioning the vang just to point where the boom will not raise up when the main sheet is eased.

With any "style" of mainsheet trimming you choose to sail with upwind it is imperative that in puffs the boat remain flat, stable and the helm balanced. Quick and deliberate adjustments to the mainsheet, vang, backstay and traveler are important. Adjust quickly but re-trim just as quickly after sailing through the puff and the boat is back under control and balanced..

BOOM VANG TENSION DOWNWIND

The boom vang is used downwind to maintain the upper batten nearly parallel to the boom. Be conscious of not over-tensioning the vang, especially in light winds, as it can greatly slow the Lightning when sailing downwind. In puffs while reaching, when the boat becomes overpowered, try dumping the vang (completely eased) to keep the end of the boom from hitting the water and also allow the top of the main to luff, dumping extra power.

The Spinnaker

Trimming your North spinnaker is fairly easy as long as you follow a few guidelines. Always attempt to fly your spinnaker so there is nearly 6" of curl in luff. This is important so the spinnaker is not over trimmed and does not choke the slot between the spinnaker and the main. We suggest flying your spinnaker with the halyard eased approximately 6" off the mast to open the slot up high. Keep your clews even at all times through adjustment to your pole topping lift. When your leeward clew is hidden behind the main and you cannot see it, keep the center seam of the spinnaker parallel to the mast. In puffy conditions, especially in lighter winds, constant adjustment of the pole height along with the sheet and guy is important. Keep the pole nearly perpendicular to the wind.

About Our Guide

This tuning guide is just a guide. You should experiment on your own using the guide as a yardstick. Keep a log on what is successful for you. None of our sails are overly sensitive to adjustment so you should focus on sailing and not become mesmerized by minute adjustments in sail trim. Focus on your steering, heel angle, main sheet and jib sheet trim. There is no substitute for experience and good basic sailing. Above all stay loose and have fun.

Sail Care

The sun is one of your sail's greatest enemies. Care should be taken to not leave an uncovered sail directly in UV light for long periods. Spinnakers are most susceptible to UV damage.

However, your sail's greatest enemy is prolonged luffing. Putting your sails up before you are ready to leave the dock and allowing them to flog unnecessarily, literally wastes valuable hours and days of the competitive life of your sails. Even before the start on a breezy day, try to spend as little time as possible with the jib up and luffing to save wear and tear. The jib especially takes a beating when luffing as it slams back and forth against the mast. This breaks down the resin in the weave of the cloth.

When finished using your sails, even after just a couple races or in-between races, we strongly suggest talking the time to roll up your sail parallel to the battens (it is never necessary to remove the battens). Be careful not to set anything heavy that can crush a sail or to lash the main too tight on to the boom. Be sure to roll the sail parallel to the battens to avoid putting a permanent twist in your special tapered fiberglass battens. Fold your spinnaker to keep it smooth before storing.

When sailing in saltwater, be sure to wash all your sails off completely with fresh water and dry completely before storing them.

Check all your sails, especially at the front and back of batten pockets and around grommets for signs of wear. Check your spinnaker for tears, so they don't get bigger and create big problems in the future. If Dacron sail tape is not available, duct tape will work just fine!

North Sails Racing Clinics

This tuning guide only begins to cover all there is to know about racing the Lightning. The Lightning team at North One Design has prepared a professional, in depth Lightning racing clinic that you and your fleet will be interested in learning more about. In the course of a weekend you will learn more about racing your Lightning than you could possibly learn in a season of racing on your own. Please call you nearest North Sails One Design loft for complete details!

At North Sails we are constantly striving to make our products better. If you have any comments on this tuning guide and how it could be improved for your purposes we'd love to hear from you. Please give us a call or drop us a line.

Contact North Sails

Please feel free to call us with any of your sailing questions and to discuss your sail trim and performance. We are anxious to help in any way we can and we look forward to working with you to provide fast, easy to trim sails and the best service available. Find the North Lightning experts contact information listed on the cover of this guide.

Good luck and have fun! Let's go race Lightnings!

TENSION GAUGE CONVERSION CHART

Over the past few year Loos Co. has introduced it's new style PT-1, 2 and 3 professional tension gauges to the market. Since many of us are replacing our older model A and B gauges with these new models we are posting the following conversion chart for your convenience.

MODEL A	MODEL PT-1		
	3/32	1/8	5/32
5	6		
10	9		
15	12	14	
20	16	16	
25	20	19	
28	23	21	
30		22	
35		27	25
38		30	28
40		33	30
42			33
44			36
45			38
46			39
47			40

NORTH SAILS ONE DESIGN
QUALITY CONTROL CHECK

Lightning

MAINSAIL		JIB		SPINNAKER	
Corners		Corners		Corners	
Cunningham		Battens		Numbers	
Tack Slug		Telltales		**Royalty** (stitched on)	
Leech Cord		Leech telltales		North Logo	
Royalty (stitched on)		Leech Line		Bag	
Numbers		Trim line			
Country Code (optional)		Royalty (stitched on)			
Battens		North Logo			
Leech Telltales		Bag			
Insignia					
North Logo					
Bag					

Checked by: _____

Date: _____ / _____ / _____