

## Headstay Calibration

The Class has obtained templates that greatly simplify the process of measuring headstay length. The template fits neatly to the bow profile, jumps around the furler drum, and measures 535mm from the stem/shear point to the foil just above the furler.



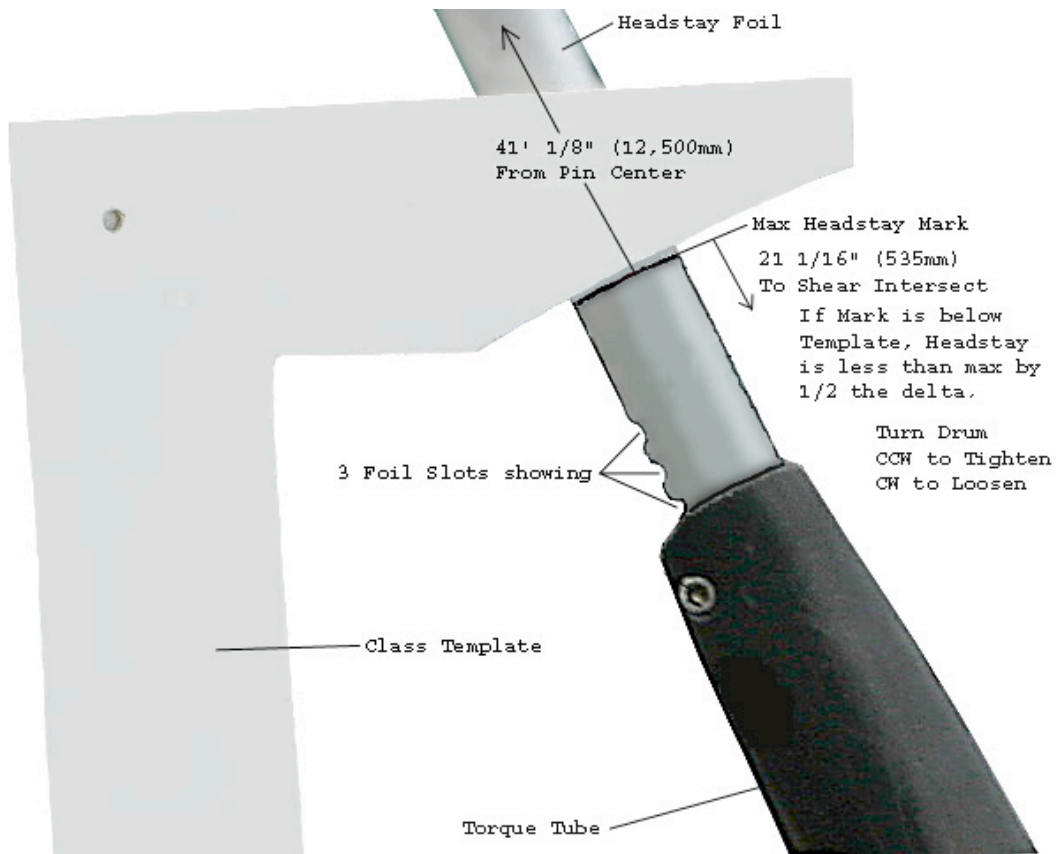
Beyond class rule compliance, the template provides a good tool for making setup of the rig accurate and repeatable. One of the major sail makers has commented that headstay setup is the single most important rig adjustment we can make. This is because the design program that makes the sail design has built in a certain amount of headstay sag when computing the shape. More or less sag affects the idea shape of the sail.

The following procedure gives a way to make a reference position at class maximum length on the jib foil that can be used to measure headstay length. Once the mark is accurately located, the template can be used repeatedly to measure any difference. If the reference mark is above the template, the headstay is longer than maximum. Use the illustration at the end of the procedure for clarification.

1. A detailed Harken produced pictorial on headstay adjustment is available through a link on the class website. The roller furler used on early production boats does not have the grooves in the foil and requires slightly different steps.
2. Tools needed are 4 and 5 mm hex wrenches, a medium adjustable wrench, a vise grip wrench, a steel tape measure, a marking pen and a small triangular file.
3. Use the hex wrenches to remove the screws from the top (2) and bottom (3) of the Torque Tube. The Torque Tube is the cover that is attached to the top of the furler drum on one end and the jib foil on the other.
4. Slide the Torque Tube up the foil (this may take some persuasion) and use the vise grip and adjustable wrench to back the inside locknut down toward the drum. This nut is normally tightened upward.
5. Use the adjustable wrench to loosen the nut on the under side of the drum and drop it and the star washer down away from the drum. The star washer is

sometimes difficult to release. Try rotating the drum slightly and using a thin blade to work it loose. Some lubrication on the threads also helps out.

6. On furlers with grooved foils: Put one of the top screws partially back into the Torque Tube so it is fastened to the foil. The foil should be positioned such that the screws fasten to the bottom two full grooves in the foil. This will allow the maximum range of adjustment. This arrangement should always stay the same to make future measurements repeatable.  
On an older style furler without grooves in the foil: Tighten the lock collar and mark the foil with the marking pen.. This will be permanently marked when finished.
7. Position the Torque Tube and attached foil back into the normal position.
8. Gather the furler take up line so it can be rotated with the drum during adjustment.
9. Tighten the backstay to take any sag out of the forestay. Just make it snug so it can be easily adjusted.
10. Hoist a crew with the end of a tape measure up the mast. The tape measure must be the steel type so it doesn't stretch.
11. Use the template to put a temporary mark on the foil.
12. Measure from the middle of the pin in the tang on the mast to the temporary mark. The magic number is 41' 1/8", which corresponds to the current maximum headstay length.
13. If the measurement is above the temporary mark, the headstay is too long, and if it is below the headstay is short of maximum by about 2x the measured distance.
14. Adjust the length by turning the drum to the formula: 8.9 turns to the inch, clockwise to loosen, counter to tighten. The number of turns will be the difference in measurement inches, divided by two, times 8.9. If the headstay is 1 inch too long the adjustment is  $\frac{1}{2} \times 8.9 = 4.5$  turns counterclockwise. The half relationship is because the headstay is inside the foil, so the template only measures the change in the lower thread. If adjusting only one end, the bottom thread will be reflected in the template position but the top thread will not.
15. Repeat Steps 10-13 as needed to get matching measurements.
16. Use the thread file to put a thin permanent groove at the measured point. This will serve as a reference point for future measurements and allow the headstay to be set without need to send crew up the mast. The length of the headstay can quickly be checked with any class template and a tight headstay, regardless of future adjustments.
17. On an older style furler without grooves in foil, use the file to mark the intersection of the foil and the top of the torque tube. This will provide a reference to make sure the tube is positioned the same when making future measurements.
18. Fasten the upper and lower lock nuts and put the Torque Tube screws back in place. The upper locknut must be as tight as possible when screwed up against the headstay. Some Blue Loctite on this and the three screws at the base will help keep them there. The upper locknut is prone to loosen so it is good to check this occasionally (with the template) to make sure that the upper portion has not loosened.



- This Headstay is adjusted to slightly less than maximum. This is determined because the mark is below the template. If the mark is above this edge, the Headstay is longer than maximum.
- 3 Foil slots are showing which insures that the foil will not interfere with adjustments.
- One lock screw is in the Torque Tube to hold the foil in place while adjusting. The Headstay can be adjusted with this in place after the top and bottom lock nuts have been loosened.

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