

Viper 640 Class Keel Measurement Procedure:

1. Relevant Class Rule:

3.4 The keel foil may be faired after September 30, 2012, subject to the following:

The keel foil may be faired only to match the Class provided Viper 640 keel template and over the section from 50 mm above the top of the keel bulb to 25 mm below where the keel exits the hull when in the lowered position, must: a) meet that shape within plus 2 mm or minus 1 mm as measured on each side of the keel foil; b) the distance from the keel's leading edge to its trailing edge measured perpendicular to the leading edge and parallel to its centerline shall be between 350 mm and 359 mm; and c) the keel foil trailing edge minimum thickness is 3 mm. The faired keel foil may be subject to inspection at any time after fairing for compliance with these tolerances and dimensions.

2. Certification and Regatta Verification Measurement:

Class Measurers conduct two different sorts of keel measurement: (i) certification measurements, which if successful will result in the issuance by the Class of a Keel Certificate, and (ii) regatta verification measurements, which don't result in the issuance of a Keel Certificate but simply certify a keel for the regatta at which the measurement is conducted.

For the purposes of a certification measurement, either the keel to be measured must be removed from the boat, or the boat must be supported by jack stands and the keel must be in its fully lowered position below the boat.

For the purposes of regatta verification measurement, the keel to be measured should be hoisted to its full up position so that the keel bulb is flush against the bottom of the hull.

3. Necessary Measurement Equipment:

- (1) Class fin section template
- (1) Class fin chord length template (with added 3mm x 3mm notch)
- (1) 3 mm diameter pin (and optional 1mm and 2mm pins)
- (1) Keel measurement form (attached)
- (1) Pencil

4. Measurement Process:

With the keel to be measured having been made accessible as described in #2 above, as is appropriate for the sort of measurement being conducted:

- (1) Determine and mark on the centerlines of both the leading and trailing edges the upper and lower extremities of the 'measured portion' of the keel foil.

For the purposes of certification measurement, the measured portion is that portion of the keel foil that is between a line drawn perpendicular to the leading edge that is 50mm above the top of the keel bulb and a line drawn perpendicular to the leading edge that is 1,090mm above the previous line.

For the purposes of regatta verification measurement, the measured portion is that portion of the keel foil that is between a line drawn perpendicular to the leading edge at a point on the leading edge 305mm below the top of the keel at the leading edge and a line drawn perpendicular to the leading edge 800mm below the previous line.

(2) Using the back edge of the Class fin section template as a straight edge, answer the following question: **Is the leading edge straight within the measured portion to within +/- 2mm over any 458 mm length (the length of the template) along the leading edge?** (For this measurement, simply slide the template up and down the leading edge of the measured portion and verify that at no point is the leading edge out of tolerance by more than 2 mm.) Enter your answer in box #1 of the measurement form.

(3) Using the Class fin chord length template, and holding the template flush against the leading edge and at 90° to the leading edge, answer the following question: **At all points along the leading edge within the measured portion, does the fin's chord length fall within the Class maximum and minimum as shown on the template?** (For this measurement, the entire chord length, including any beveled section of the trailing edge is measured.) Enter your answer in box #2 of the measurement form.

(4) Using the Class fin section template closed around keel in the measured section, and holding the template at 90° to the leading edge, answer the following question: **At all points along the leading edge within the measured portion, does the fin section at that point fit within the Class fin section template?** (If the template will not close around the fin at any point along the measured section, then that section is too big, and the answer is 'No'.) Enter your answer in box #3 of the measurement form.

(5) Assuming that every fin section within the measured portion fits within the Class fin section template, and still holding the template 90° to the leading edge, answer the following question: **For every section within the measured portion, is there any point along either surface of any given section, forward of a point 3mm ahead of the trailing edge, where the gap between fin section and Class fin section template exceeds 3mm?** Enter your answer in box #4 of the measurement form. (For this measurement, adjust the 4 circular template spacers so that any gap between the fin section being measured and Class fin section template is minimized. Tighten spacers securely so as to insure that template does not move while measuring the gap between fin section and template, and then using the 3mm pin, determine whether at any point at the leading edge or on either side of the fin section being measured, this gap exceeds 3 mm. If the cross-sectional dimensions of the keel fin sections vary along the measured portion, the circular template spacers will have to be readjusted from one section to another before measurements can be made. It may be helpful in adjusting the template spacers to use the 3mm or the optional 1mm or 2mm pins to maintain a desired gap at the leading edge.)

(6) Using a 3 mm x 3 mm notch cut in the Class fin chord length template, and holding the template so that the bottom of the notch is perpendicular both to the centerline of the keel section and to the trailing edge, answer the following question: **Is there any point along the trailing edge where trailing edge touches the bottom of the notch and the top corners of the notch are not in contact with both sides of the fin section 3 mm forward of the trailing edge?** Enter your answer in box #5 of the measurement form.

(7) The measured keel is Class legal if and only if you have recorded the following set of answers:

Box #1	Yes
Box #2	Yes
Box#3	Yes
Box#4	No
Box#5	No

Answer the following question: **Do your answers in boxes#1-5 exactly match the above set of answers?** Enter your answer in box#6 of the measurement form.

The measured keel is Class legal if you have entered 'Yes' in box#6 of the measurement form; otherwise, it is not.

(8) If the measured keel is Class legal, sign the completed measurement form, make a copy for yourself, and give the original to the boat owner.

Keel Measurement Form

Boat Owner (Name & Address):

Boat VIN Number:

Measurement Questions:

1. Within the measured portion, is the leading edge straight to within a tolerance of +/- 2 mm (over the length of the Class fin chord length template)?

Yes / /

No / /

2. At all points along the leading edge within the measured portion, does the fin's chord length fall within the Class maximum and minimum as shown on the template?

Yes / /

No / /

3. At all points along the leading edge within the measured portion, does the fin section at that point fit within the Class fin section template?

Yes / /

No / /

4. For every section within the measured portion, is there any point along either surface of that section, forward of a point 3 mm ahead of the trailing edge, where the gap between fin section and Class fin section template exceeds 3 mm?

Yes / /

No / /

5. Is there any point along the trailing edge where trailing edge touches the bottom of the notch and the top corners of the notch are not in contact with both sides of the fin section 3 mm forward of the trailing edge?

Yes / /

No / /

6. Are the answers, in order, to Questions 1-5 above 'Yes', 'Yes', 'Yes', 'No', and 'No'?

Yes / /

No / /

The measured keel is Class legal for the type of measurement being conducted if and only if Question #6 is answered 'Yes'.

ATTESTATION: I, _____, having measured the above-mentioned boat's keel in accordance with the Viper Class Measurement Procedure, attest that this keel IS / IS NOT [circle one] Viper Class legal for CERTIFICATE / REGATTA VERIFICATION [circle one] purposes.

(Signature of Class Measurer)

(Date Measured)