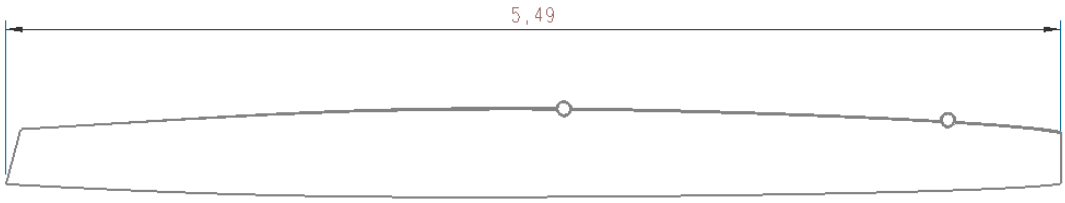
ISAF International A Class Catamaran-Measurers' Guide

All A Division Catamarans shall have a valid measurement form for sail, mast & hull which are available on the IACA website. These forms are largely self-explanatory and the following notes should assist in their understanding.

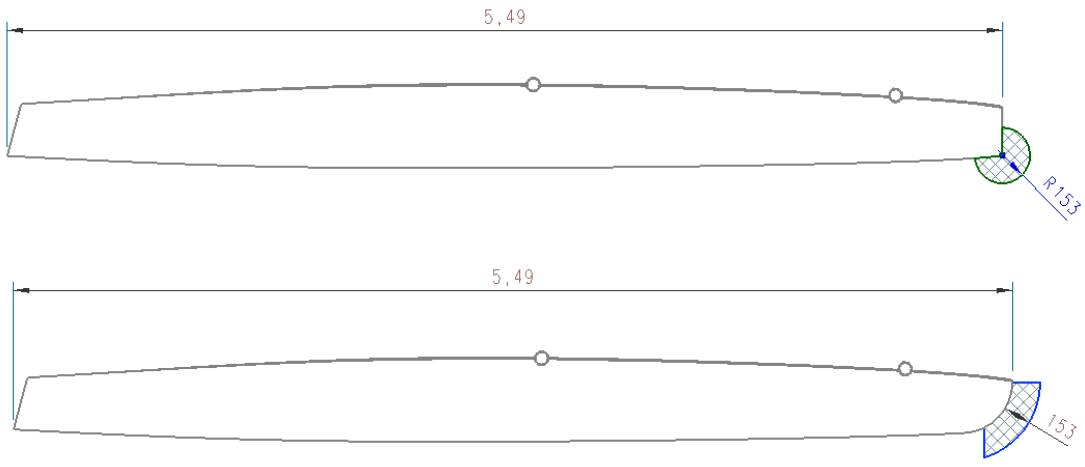
Hull Measurement

This area is self-explanatory with only three measurements noted on measurement form, this is width, length and minimum distance to centerline of all appendages in any position.

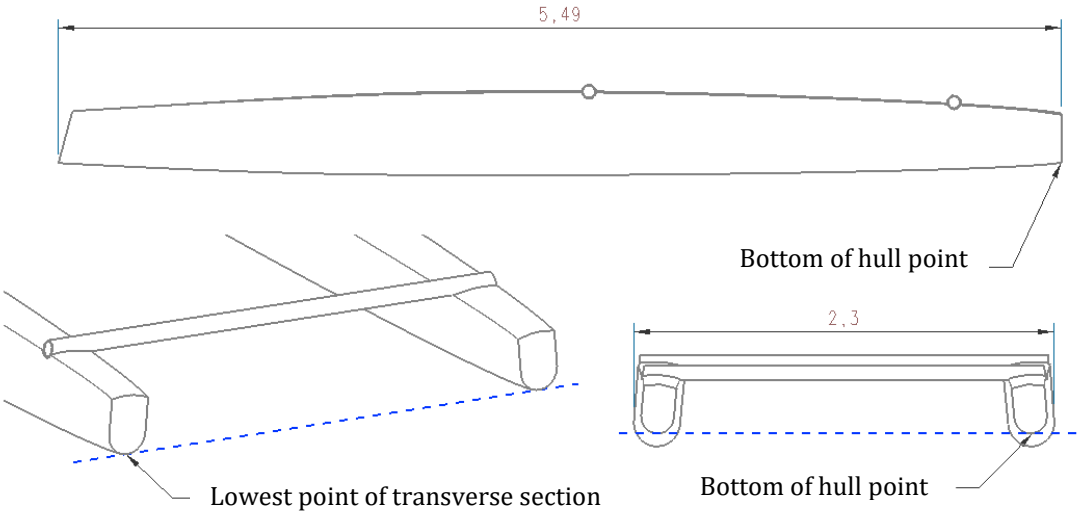
The overall length of the craft is 5.49 m (18 feet), which is the hull length. It does not include rudder hangings and is basically the distance between perpendiculars to the extremities of the hull in normal trim (boat approximately parallel with waterline) and any other fittings attached to boat, other fittings may include foot loops, inspection ports and external transom reinforcement. If the width of a rudder within 153mm (6 inches) of the bottom of the hull is



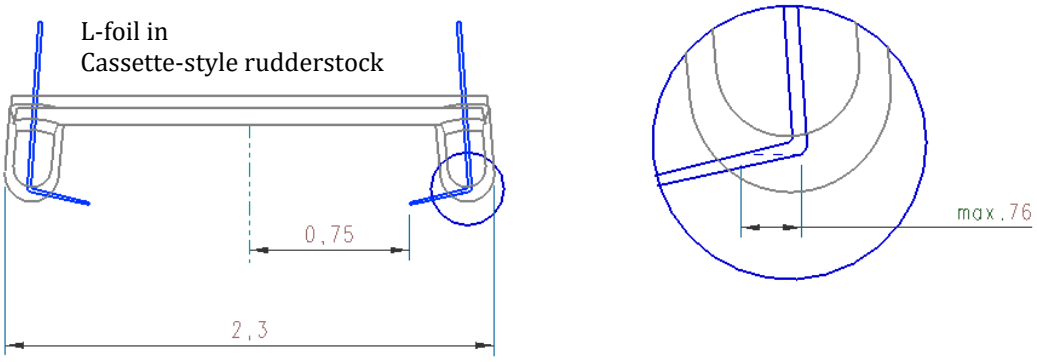
more than 76mm (3 inches) the length measurement needs to go to the aftermost point of the rudder.



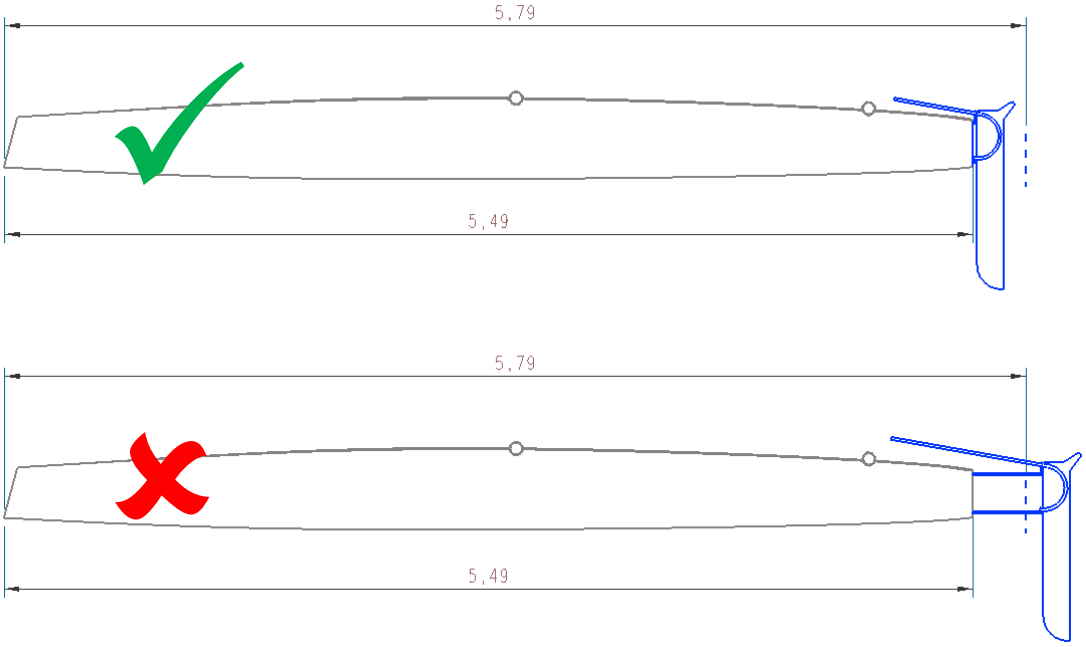
The Technical Committee has defined bottom of the hull as follows " Bottom of the hull measurement points are the lowest points on the hull at all transverse sections". This means that on any point of a hull if a cross section cut was taken the lowest point of this cut would define bottom of hull. We are looking for the closest point to the rudder assembly. With "standard" type hulls at present with flat stern this point would be at the lowest point of the intersection of stern and hull bottom. Should you encounter a boat with a canoe type stern this point could effectively move around hull stern.



Remember we are only interested in this aspect if rudder blade or case is wider than 76mm (3 inches) within 153mm (6 inches) of bottom of the hull point. If so the overall length of boat needs to include rudder assembly.
You also need to be aware within the above rule if rudder blades with winglets or "L" & "T" shaped rudders that are in dagger board type rudder cases that can be raised whilst sailing are wider than 76mm (3 inches) they cannot be within 153mm (6 inches) of this point and a stop or band signifying this point must be evident on rudder.
Keep in mind that this 76mm (3 inch) width measurement is a horizontal measurement to the major axis of the craft so with angled hulls some small winglets or "L" rudders that are angled at greater than 90 degrees may fit within this measurement.

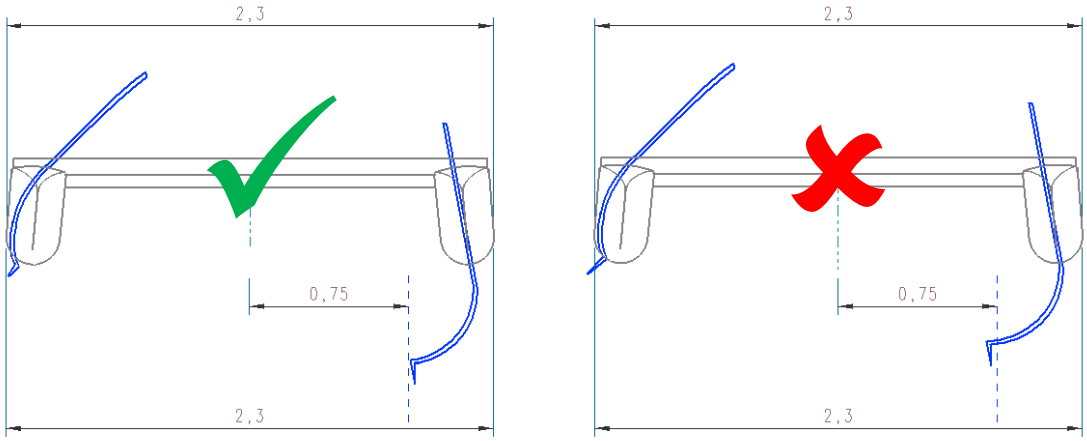


The Technical Committee has now clearly defined rudder hangings (Interpretation 7), which is self-explanatory and effectively stops the use of extended rudder gantries, rudder hangings and hull fairings. The rudder in a fully down position should not extend more than 5.79m from front of boat (30cm from stern) when in line with major axis of hull length.



With width, measurement is at the widest point of the hull. This may be at some point down the sides of the hulls, especially if hulls are angled or at the very top if hull rails or ledges are attached for trapezing, foot loops attached to hulls are also included in width. All hull appendages must fit within the maximum width in all positions (completely down and completely up flush with the bottom of the hull).

Any part of hull appendage cannot go out side maximum width of 2.3m or inside minimum distance of .75m from centerline at any point after exiting bottom of hull.

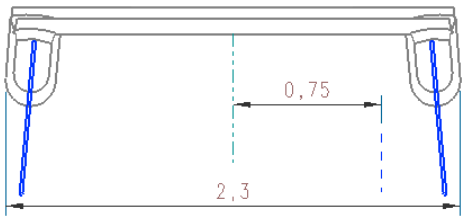


In regards to centreboards they must be able to be inserted from the top of hull and be easily removable on land and water or be capable of being fully retractable into the hull (We have not seen this aspect in current boats but they would be similar to centreboards used on say Tornado, 470 etc.)

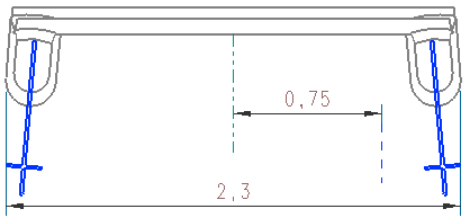
Rudder blades with wings, foils etc. also need to fit within these requirements. This measurement is to be undertaken with rudder fittings parallel to boat centreline.

Rudders:

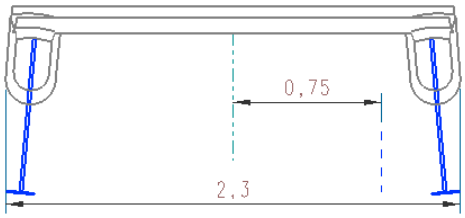
Straight rudders



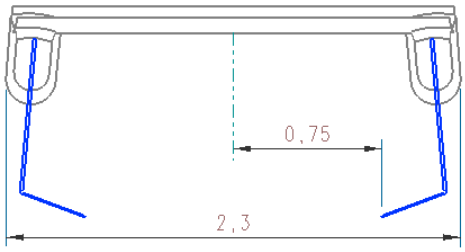
Rudders with winglets



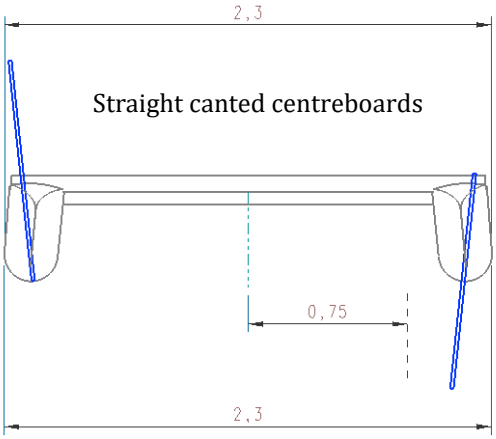
Rudders with T-foils

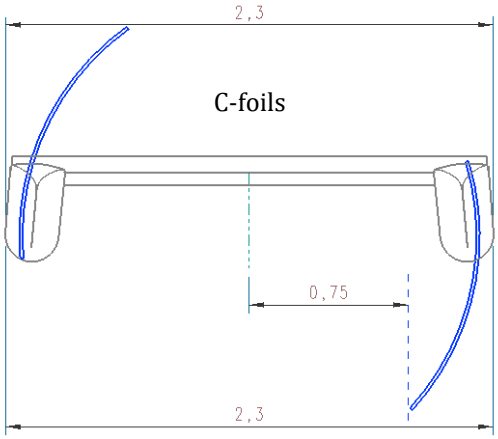


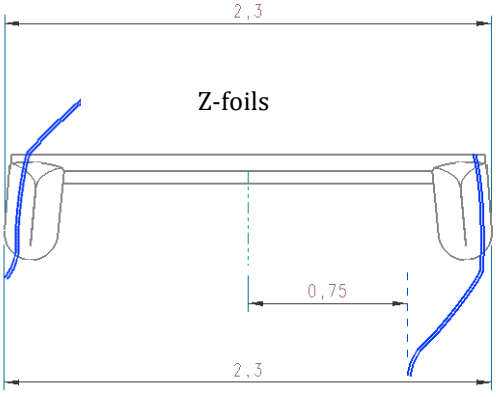
Rudders with L-foils



Centreboards:







All measurements for hull appendages are to be taken in a static position. Should appendage be moveable in case or box, appendage to be placed so that least desirable measurement is taken.

All boats constructed after 1/1/2010 must have an ISAF plaque affixed to starboard transom before measurement certificate can be issued.

Sail Measurement Form

When undertaking sail measurement the following points should be noted.

Sail to be measured on a flat surface and laid out in terms of the IYRU Measurement & Calculation of Sail Area Instructions, that is:
(A copy of these instructions from the ISAF International measurers manual is on the IACA website)

" With battens set in their pockets the sail shall be pegged out on a flat surface with just sufficient tension to remove waves or wrinkles from the edge rounds and to spread the sail as far as possible, substantially flat. Once the sail has been pegged out in this way all the required measurements shall be taken and no alterations to the tensions shall be made."

Luff length A is the maximum distance from the head to the tack of the sail. It is taken on the inside of the boltrope, which is not included in any measurement.

Base length P is a measurement from the clew to a point at 90 degrees to A.

Measurement M, F, K, D and H are all made at 90 degrees to their respective lines. All are to be the maximum distance that can be taken provided offsets are constant curves. Note this may mean that some measurements are zero or in the case of a hollow leech or foot a negative figure and this must be shown as such on measurement form. Negative areas can be deducted from overall sail area.

The sail measurement form should be used as a guide only and to date has adequately covered standard type sails as in Fig1.

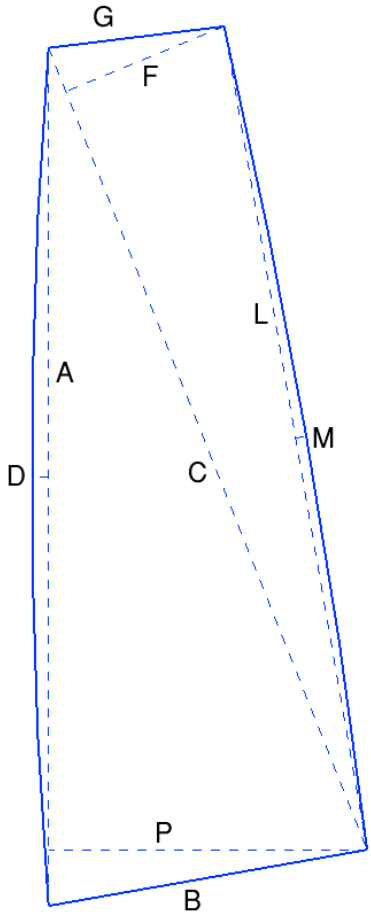


Fig 1. F measurement may be to top of sail thus eliminating, J,H & K measurements

The advent of decksweeper type sails has presented a new challenge and as a measurer we must adjust accordingly. Remember the principals are the same with the basic goal to measure the total area of the sail. Measurement is made up of the total areas of triangles and offsets. It is your responsibility to use a combination of these to give the most accurate measurement. The basics of head, tack and clew still remain and in the decksweeper diagram (Fig2) the lower part of the sail now can be looked at in a similar fashion to foot round which we would normally calculate as 2/3(BxE) due to the constant curvature of the foot. In this case however as all sides are straight we can adjust to 1/2(BxE) as we are measuring a triangle. This change simply needs to be noted on the measurement form so an Equipment Inspector can see what has happened. You have the option of further breaking the sail into further triangles and off sets if considered necessary to give further roach area measurements. We are now seeing sails that do not have a constant leach curve and in this case it may be necessary to use all roach area measurements as noted on measurement form. (Fig3)

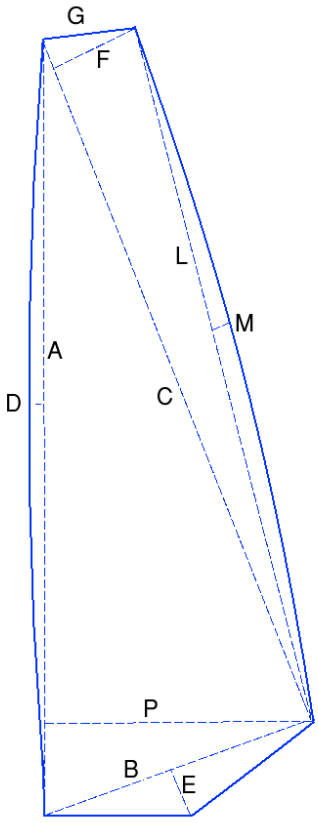


Fig 2

End Plates/ Sail Flaps

Decksweeper type sails attempt to obtain an "end plate" effect by the sail touching the trampoline. As long as the sail is not attached to the trampoline this is legal. Should this not be the case then the measurement guidelines state that only elements of the sail plan that are vertical are measured. Elements of the sail plan which are horizontal or nearly so when the yacht is not heeled are not measured provided the total area of the end plate surface does not exceed 10% of the total sail area (1.394sqm). Note this measurement is the area of one side of the end plate only. Individual circumstance will dictate how big this area may be. For a boat that has a trampoline fully sealed to the hulls it could be 1/2 the total area of the trampoline and the horizontal

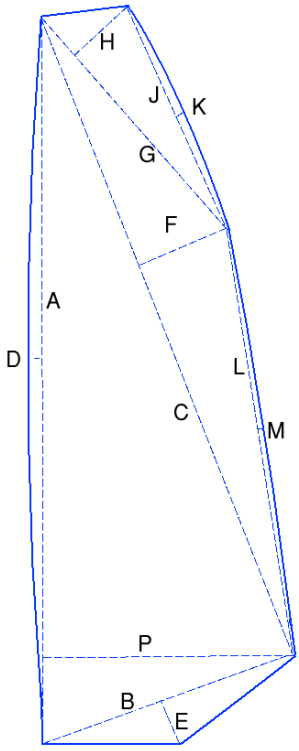


Fig 3

surfaces of all hulls. Your calculation needs to be fully documented and noted on measurement form.
We are also seeing the advent of adjustable flaps added to decksweeper sails to adjust the foot of the sail to the trampoline profile. These flaps or similar can be adjusted on the sail with velcro or similar type fastening. This flap needs to be measured in its own right and added to the total sail area and mast area, again note this on measurement form.

Black Bands

No longer required

Following measurement Measurer is to write the following on bottom starboard side of sail.
SA=???sqm
Luff =???m
Base=???m
Measurer's Signature
Date

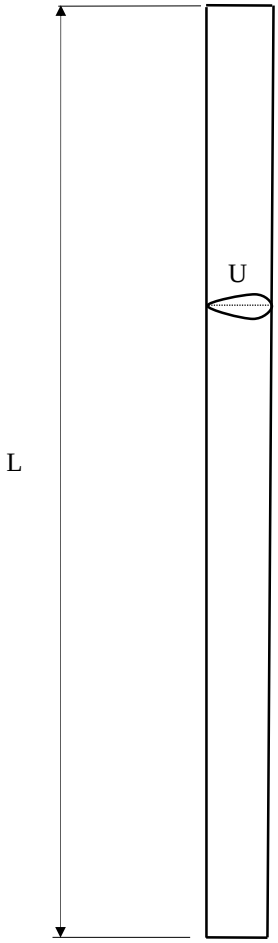
Mast & Boom Measurement Form

The purpose of this measurement is to find half the total area of the mast and any mast base fitting and fairing devices attached. On a straight section (i.e. not tapered) it is simply the length of mast and base x half the mast girth. The Measurement and Calculation of Sail Area instructions define girth as follows:

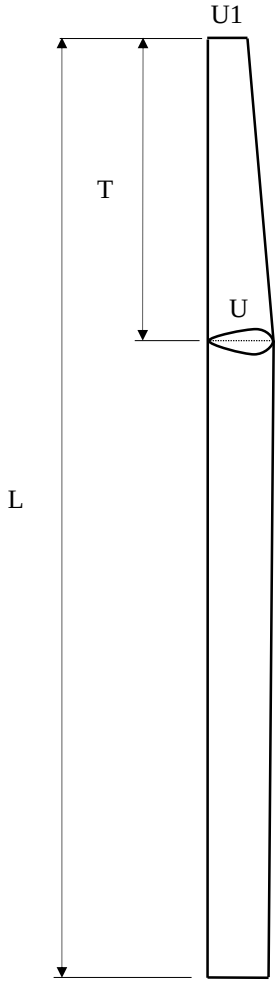
" The girth measurement shall be taken as the distance from the centerline round the surface of the spar to the same point on the centerline. The resultant dimension shall be divided by two to give the half girth measurement".

Should mast be tapered extra measurement U1 & T need to be taken and the formula on the measurement certificate utilized.

Straight Mast
MA = U x L/2

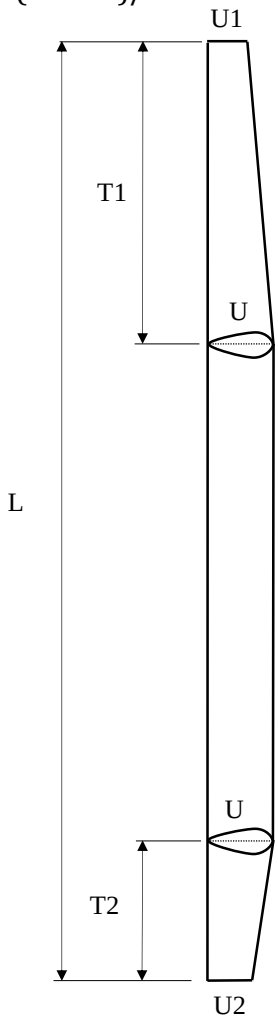


Tapered Mast
MA = U x (L-T)/2 +
T x (U + U1)/4

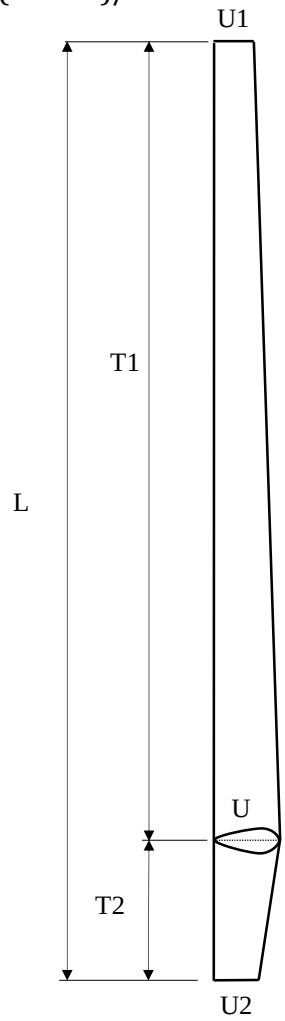


Double tapered masts mast also need the T2 and U2 measurement to be taken.

Double Tapered Mast
MA = U x (L-T1-T2)/2 + T1 x (U + U1)/4 + T2 x (U + U2)/4



Fiberfoam DNA mast
MA = T1 x (U + U1)/4 + T2 x (U + U2)/4



As the most common case of a double tapered mast, we have shown the Fiberfoam DNA mast, which doesn't have a straight section in the middle. This means that L=T1+T2, and therefore the formula can be simplified a little.

Boom measurement is only utilized if the profile height of the boom is more than 1.5 of the width. Boom fittings and anti- fouling such as boom sleeves are allowed as long as their primary purpose is to maintain the safe working of running systems.

Following measurement measurer is to write the following in a contrasting colour on the starboard side of mast bottom.

MA = ???sqm
SN = ?(mast serial no.)
Measurer's Signature
Date

General

Boat weight is not included on any of these forms as this is the owner's responsibility to apply and carry any correctors if necessary. The weight of the boat consists of all equipment used to take part in a race and may include a compass. Spare battens allowed under our Championship Rules, consumables, portable equipment and personal equipment are not to be included in a boats weight.

(Note spare battens used in a race shall not weigh less than those included in the measurement weight.)

The boat must be weighed in dry condition and any weights attached to bring the boat to a minimum weight of 75 kilograms must be permanently affixed.

Technical Committee
IACA 05/10/2017