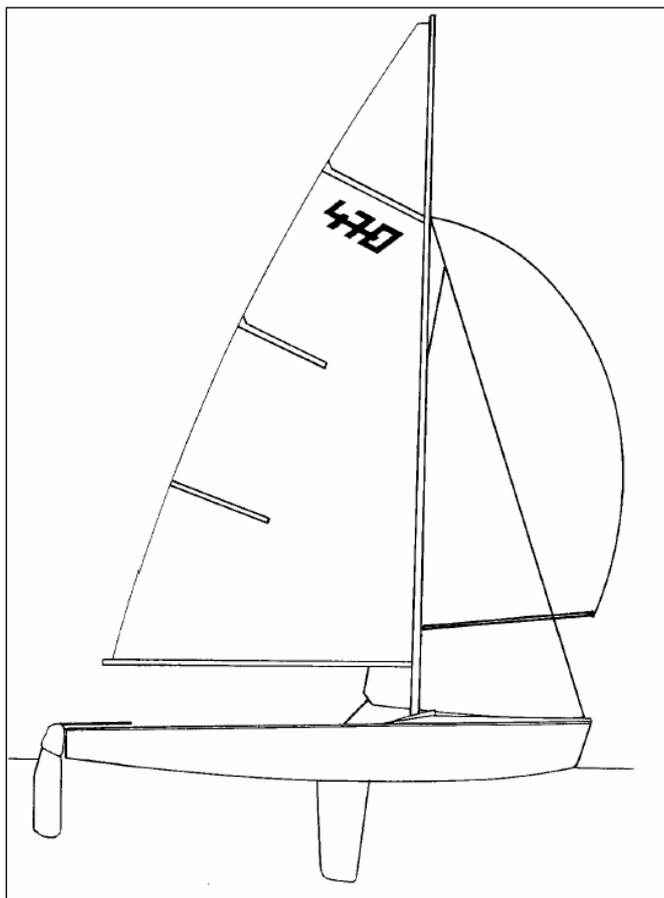




**INTERNATIONAL
470
CLASS RULES
2011**



The 470 was designed in 1963 by Andre Cornu and was adopted as an international/recognised class in 1969.

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INTRODUCTION

This introduction only provides an informal background and the International 470 Class Rules proper begin on the next page.

The 470 is a One-Design racing dinghy with an overall length of 4.70m for a crew of two, designed by Andre Cornu in 1963 and adopted as an International/Recognized class in 1969 and became an Olympic Class in 1976 where the class was sailed as an open event before the introduction of separate events for men and women in 1988.

Class rules may evolve, while the intention is to avoid the use of costly, short-lived, risky or environmentally improper materials.

470 hulls, hull appendages, rigs and sails are measurement controlled.

Rules regulating the use of equipment during a race are contained in Section C of these class rules, in ERS Part I and in the Racing Rules of Sailing.

Owners and crews should be aware that compliance with rules in Section C is not checked as part of the certification process.

PART I – ADMINISTRATION

Section A – General

A.1 LANGUAGE

- A.1.1 The official language of the class is English and in case of dispute over translation the English text shall prevail.
- A.1.2 The word “shall” is mandatory and the word “may” is permissive.
- A.1.3 The term "secured" shall mean held in place by positive means.
- A.1.4 The term "fastened" shall mean held in place with bolts or screws.
- A.1.5 The term "permanent" shall mean unable to be removed with simple tools, or fixed with glue or rivets. For limit marks, it shall mean unable to be removed and repositioned without destroying them.
- A.1.6 The term "alteration" shall mean a substantial change from the original condition.
- A.1.7 A dimension or other requirement in the text overrides the same in a Figure.
- A.1.8 All units are metric.
- A.1.9 All dimensions are in millimetres.
- A.1.10 Drawings generally show the transom to the left and the stem to the right, measuring is usually from left to right, but for practical reasons some drawings are tilted.

A.2 ABBREVIATIONS

- A.2.1 ISAF International Sailing Federation
- MNA ISAF Member National Authority
- ICA International 470 Class Association
- NCA National 470 Class Association
- ERS Equipment Rules of Sailing
- RRS Racing Rules of Sailing

A.3 AUTHORITIES

- A.3.1 The international authority of the class is the ISAF, which shall co-operate with the ICA in all matters concerning these **class rules**.
- A.3.2 Neither the ISAF, an MNA, the ICA, an NCA, a certification authority, or an official measurer are under any legal responsibility in respect of these class rules and the accuracy of measurement, nor can any claims arising from these be entertained.
- A.3.3 Notwithstanding anything contained herein, the certification authority has the authority to withdraw a certificate and shall do so on the request of the ISAF.

A.4 ADMINISTRATION OF THE CLASS

- A.4.1 ISAF has delegated its administrative functions of the class to MNAs. The MNA may delegate part or all of its functions, as stated in these **class rules**, to an NCA.
- A.4.2 In countries where there is no MNA, or the MNA does not wish to administrate the class, its administrative functions as stated in these **class rules** shall be carried out by the ICA which may delegate the administration to an NCA.

A.5 ISAF RULES

- A.5.1 These **class rules** shall be read in conjunction with the current version of ERS.

- A.5.2 Except where used in headings, when a term is printed in “**bold**” the definition in the ERS applies and when a term is printed in “*italics*” the definition in the RRS applies.
- A.5.3 These rules are complementary to the Building Specification Plan and Measurement Form.

A.6 CLASS RULES VARIATIONS

- A.6.1 At World, Continental or Regional Championships the notice of race and sailing instructions may change the **class rules** only with the agreement of the ICA and the ISAF.
- A.6.2 At National events the notice of race and sailing instructions may change the **class rules** only with the agreement of the NCA and the MNA.
- A.6.3 At class events, these **class rules** shall not be varied by the notice of race and sailing instructions except as provided by A.6.1.

A.7 CLASS RULES AMENDMENTS

- A.7.1 Amendments to these **class rules** are subject to the approval of the ISAF in accordance with the ISAF Regulations.

A.8 CLASS RULES INTERPRETATIONS

- A.8.1 Interpretation of **class rules** shall be made in accordance with the ISAF Regulations.

A.9 INTERNATIONAL CLASS FEE AND ISAF BUILDING PLAQUE

- A.9.1 The licensed hull builder shall pay the International Class Fee.
- A.9.2 ISAF shall, after having received the International Class Fee for the hull, send the ISAF Building Plaque and a measurement form to the licensed hull builder.

A.10 SAIL NUMBERS

- A.10.1 Sail numbers shall be issued by the MNA of the country where the boat is registered, which may delegate this function to the NCA.
- A.10.2 Sail numbers shall be issued in consecutive order starting at “1”.
- A.10.3 In accordance with ISAF RRS Appendix G1.1 (c), the MNA or NCA may issue personal sail numbers (Sail numbers staying with the owner for every boat he legally possesses as long as he sails 470) for which the authority may raise a fee. This number must be shown on the Certificate and shall not conflict with existing numbers of active boats. After the sale of the boat, the new owner has to use her original sail number or his own personal number on his sails.
- A.10.4 Competitors may use the sail number of any hull still owned by them, on any boat chartered or owned by them.

A.11 HULL CERTIFICATE

- A.11.1 No boat shall take part in class races unless it has a valid measurement certificate in the owner's name. The measurement certificate is only valid if the owner is a current member of a national 470 Class Association or, if there is no national 470 Class Association in his nation, member of the 470 International.
- A.11.2 A **certificate** shall record the following information:
- (a) Class
 - (b) **Certification authority**
 - (c) Sail number(s) in accordance with A.10.
 - (d) Owner's name and address.

- (e) Hull identification (*see D.1.4*)
- (f) Builder / manufacturer's details
- (g) Date of issue of initial **certificate**
- (h) Date of issue of **certificate**
- (i) Measurer's name.

A.12 INITIAL HULL CERTIFICATION

- A.12.1 For a **certificate** to be issued to a hull not previously **certified**:
- (a) **Equipment certification control** shall be carried out by an **official measurer**.
 - (b) The measurement form(s), and **certification** fee, if required, shall be sent to the **certification authority**.
 - (c) Upon receipt of a satisfactorily completed measurement form(s) and **certification** fee, if required, the **certification authority** may issue a **certificate**.

A.13 VALIDITY OF CERTIFICATES

- A.13.1 A hull **certificate** becomes invalid upon:
- (a) the change to any items recorded on the hull **certificate** as required under A.11.2
 - (b) the date of expiry or change of ownership,
 - (c) withdrawal by the **certification authority**,
 - (d) the issue of a new **certificate**.
- A.13.2 Older hulls need not be re-certified if the rules under which they were built are changed (grandfather rule).

A.14 HULL RE-CERTIFICATION

- A.14.1 The **certification authority** may issue a new **certificate** to a previously certified hull:
- (a) When the certificate has become invalid under A.13.1 (a) or (b), after receipt of the old **certificate**, and **certification** fee if required.
 - (b) When the certificate has become invalid under A.13.1 (c), at its discretion.
 - (c) In other cases, by application of the procedure required for initial hull **certification**.

A.15 RETENTION OF MEASUREMENT FORMS

- A.15.1 The **certification authority** shall;
- (a) retain the original measurement form(s) upon which the current certificate is based,
 - (b) upon request, transfer those measurement form(s) to the new certification authority if the hull is exported.

Section B – Boat Eligibility

For a **boat** to be eligible for *racing*, it shall comply with rules in this section.

B.1 CLASS RULES AND CERTIFICATION

- B.1.1 The boat shall;
- (a) Be in compliance with the **class rules**.
 - (b) Have a valid hull **certificate**.
 - (c) have valid **certification marks** as required

B.2 TAGS

- B.2.1 At championships or principal events the race committee may arrange for boats and/or sails to be partly or completely re-measured before racing. Parts measured shall be marked with a tag (sticker/stamp which may be signed and numbered by the Measurer). Tags of previous events shall be ignored.

B.3 FLOTATION CHECKS

- B.3.1 It is the responsibility of the owner to ensure at all times the water tightness of the boat.

B.4 CLASS ASSOCIATION STICKER AND LABELS

- B.4.1 A valid class association sticker, if required by the NCA, shall be affixed to the **hull** or hull **certificate** in a conspicuous position.
- B.4.2 Sails shall carry a sail button / sticker issued by the ICA.

PART II – REQUIREMENTS AND LIMITATIONS

The **crew** and the **boat** shall comply with the rules in Part II when *racing*. Measurement to check conformity with rules of Section C is not part of **equipment certification control**.

The rules in Part II are **closed class rules**. Measurement shall be carried out in accordance with the current version of ERS except where varied in this Part.

Fittings may be combined as long as no additional function is added

Section C – Conditions for Racing

C.1 GENERAL

C.1.1 RULES

(a) The following RRS 2009-2012 rules shall apply as amended below:

- (1) If the average wind speed is above 8 knots, measured at deck level, the race committee may permit pumping, rocking and ooching after the starting signal. (change of RRS 42.2(a), RRS 42.2(b), RRS 42.2(c))._ The signals will be made according to RRS P5._
- (2) A trapeze system may be used (change of RRS 49.1).

(b) The ERS Part I – Use of Equipment shall apply.

C.2 CREW

C.2.1 LIMITATIONS

- (a) The **crew** shall consist of two persons.
- (b) No **crew** member shall be substituted during an event, unless authorised by the Race Committee.
- (c) The trapeze system shall not be used by more than one **crew** member at any time.

C.3 PERSONAL EQUIPMENT

C.3.1 MANDATORY

- (a) The boat shall be equipped with personal buoyancy for each **crew** member to the minimum standard ISO 12402 Level 50, or USCG Type III, or AUS PFD 1 or equivalent. Inflatable buoyancy vests are not permitted.

C.3.2 OPTIONAL

- (a) Trapeze harness. The weight shall not exceed 3 kg, measured according to current version of RRS, appendix H.

C.3.3 TOTAL WEIGHT

- (a) The total weight of personal equipment worn, excluding trapeze harness, shall not exceed 9 kg, measured according to current version of RRS, appendix H.

C.4 ADVERTISING

C.4.1 LIMITATIONS

Advertising shall only be displayed in accordance with the ISAF Advertising Code. See ISAF Regulation 20.

C.5 REMOVABLE EQUIPMENT

C.5.1 FOR USE

(a) OPTIONAL

- (1) One hand bailer or bucket.
- (2) Up to two compasses, which may be included in timing devices. If electronic, only compasses with heading, heading memory and timing functions are permitted.
- (3) Electronic or mechanical timing devices which may include a compass, and which shall be removable. Wrist watches with compass functionality are permitted additionally. No other electrical or electronic devices than those prescribed in C.5.1 and those required by an organizer and the ICA to be carried by boats shall be permitted on board when racing.

C.5.2 NOT FOR USE

(a) OPTIONAL

- (1) One paddle.
- (2) Spare parts such as blocks, shackles, ropes, etc...

(b) MANDATORY

- (1) Towing rope of floating type with a minimum length of 10m and of not less than 8mm in diameter.

C.6 BOAT

C.6.1 WEIGHT

minimum

The weight of the **boat** shall be 120 kg,
measured with the **boat** in dry condition, including
compasses, but excluding **sails**, jib luff wire and all
removable equipment.

C.6.2 CORRECTOR WEIGHTS

- (a) When the **boat** weight is less than the minimum, **corrector weights** shall be fastened under the mast partner or to the top of the forward bulkhead.
- (b) The total weight of such **corrector weights** shall not exceed 2.0 kg.

C.6.3 FLOTATION

- (a) If in doubt regarding compliance with B.3, an **equipment inspector** may order a buoyancy test, afterwards checking the tanks for significant leakage. If the buoyancy is deemed unsatisfactory, the **certificate** shall be withdrawn and not returned until satisfactory remedial measures have been taken.

C.6.4 All fittings, fastenings and local reinforcement for fittings shall be only for their normal purpose and shall not be used to increase the weight of the **boat**.

C.7 HULL

C.7.1 MODIFICATIONS AND MAINTENANCE

- (a) The hull shell, deck, bulkheads and cockpit floor as supplied by the licensed builder shall not be altered in any way except as permitted by these **class rules**.

- (b) Routine maintenance such as small repairs, painting, sanding and polishing is permitted without re-measurement and re-**certification**.
- (c) If any hull moulding is repaired in any other way than described in C.7.1(b), an **official measurer** shall verify on the **certificate** that the external shape is the same as before the repair and that no substantial increase in stiffness, or other, advantage has been gained as a result of the repair. The **official measurer** shall also describe the details of the repair on the **certificate**.
- (d) Non-slip material, tape and low-friction material not exceeding 4mm in thickness may be added to the **boat** as long as it does not change the stiffness of the **hull**.

C.7.2 FITTINGS

(a) USE

- (1) Inspection hole covers and drainage plugs shall be kept in place at all times when racing.
- (2) Except when specified otherwise or a system is optional, the direction of the control lines, sheets and ropes shall not be modified by means of shackles, rings, loops or holes in the boat.

C.8 HULL APPENDAGES

C.8.1 MANUFACTURERS

- (a) Manufacturer is optional.

C.8.2 LIMITATIONS

- (a) Only one **centreboard** and one **rudder** blade shall be used during an event, except when a **hull appendage** has been lost or damaged beyond repair.

C.9. CENTREBOARD

C.9.1 MATERIALS

The **centreboard** shall be made from one or a combination of the following materials; wood, plywood, polyester reinforced with glass fibre, epoxy reinforced with glass fibre and/or plastic foam which includes micro balloons and may be painted.

C.9.2 FITTINGS

OPTIONAL

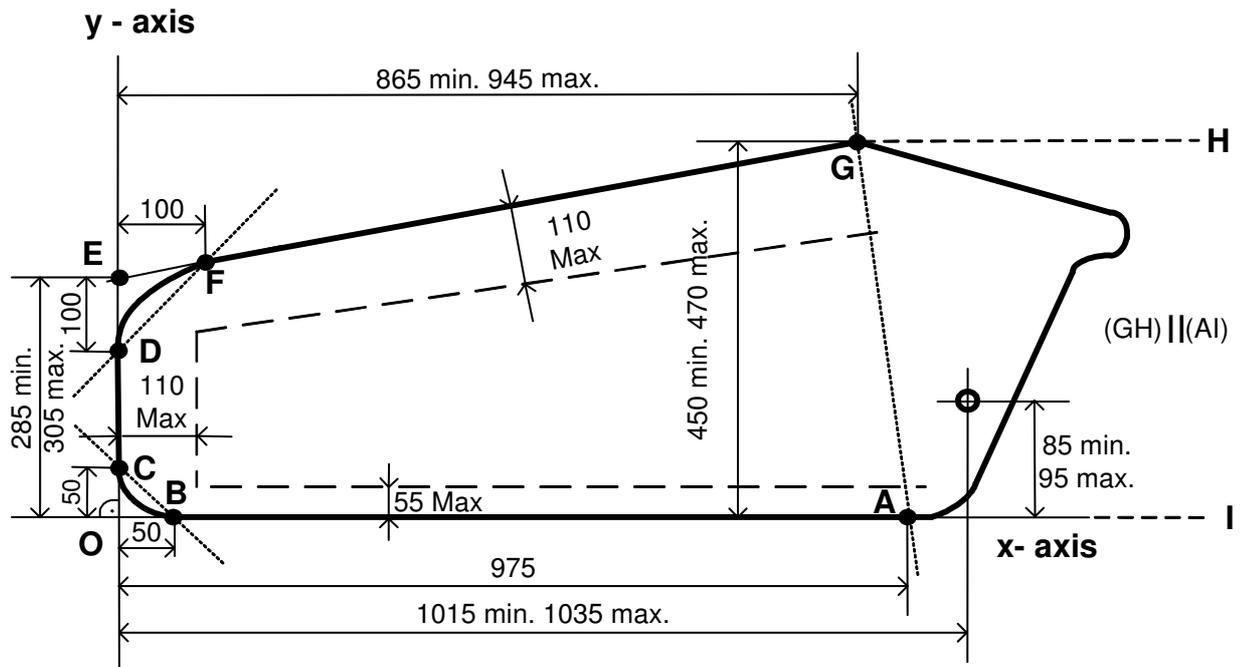
- (1) Blocks and associated fittings for hoisting/lowering the **centreboard**.
- (2) A bushing round the pivot of the centreboard.

C.9.3 DIMENSIONS

- (a) Dimensions shall conform to the centreboard measurement diagrams as shown in C.9.4.
- (b) The **centreboard** shall be of even thickness throughout, minimum 20mm and maximum 24 mm, except that the edges may be bevelled over distances of 110 mm from the trailing and lower edges, and 55 mm from the leading edge.
- (c) Except for permitted bevelling, the thickness shall not vary by more than 1 mm.
- (d) The **centreboard** shall not be pierced by lightening holes.

C.9.4 CENTREBOARD MEASUREMENT DIAGRAMS

The contour of the centreboard is defined by the points A, origin O, E, G, the lines (GH) and (AI), as Figure “Centreboard Measurement” shows.



Centreboard Measurement

(a) DEFINITIONS OF MEASUREMENT POINTS AND LINES

The centreboard shall touch points A, B and C. These points are integral to the centre board.

The x and y axes are square to each other.

A is the point on the x-axis 975mm from the origin O.

B is the point on the x-axis 50mm from the origin O.

C is the point on the y-axis 50mm from the origin O.

Point F is the point on the trailing edge 100mm from the y-axis.

Point G is the widest point of the centreboard on the trailing edge.

Point E is the extension of the trailing edge (FG) on the y-axis.

Point D is the point on the lower edge 100mm from point E, measured along the y-axis. It shall be no more than 2mm from the y-axis.

(b) DIMENSIONS

	minimum	maximum
Distance from the centre of the pivot hole to the x-axis	85 mm	95 mm
Distance from the centre of the pivot hole to the y-axis	1015 mm	1035 mm
Distance from E to the x-axis	285 mm	305 mm
Distance from G to the outmost point of the leading edge (AB)		470 mm
Distance from G to the innermost point of edge (AB).....	450 mm	
Distance from G to the y-axis.....	865 mm	945 mm
Total (positive, negative or both) deviation of an edge from a straight line:		
Between points A and B from the x-axis		2 mm
Between points C and D from line (CD)		2 mm
Between points F and G from line (FG)		2 mm

Line (AI) lies on the x-axis. Line (GH) is parallel to the x-axis. The length of the lines (AI) and (GH) is arbitrary. The contour of the centreboard inside the area AGHI is free, but no part of the centreboard shall lie outside this area.

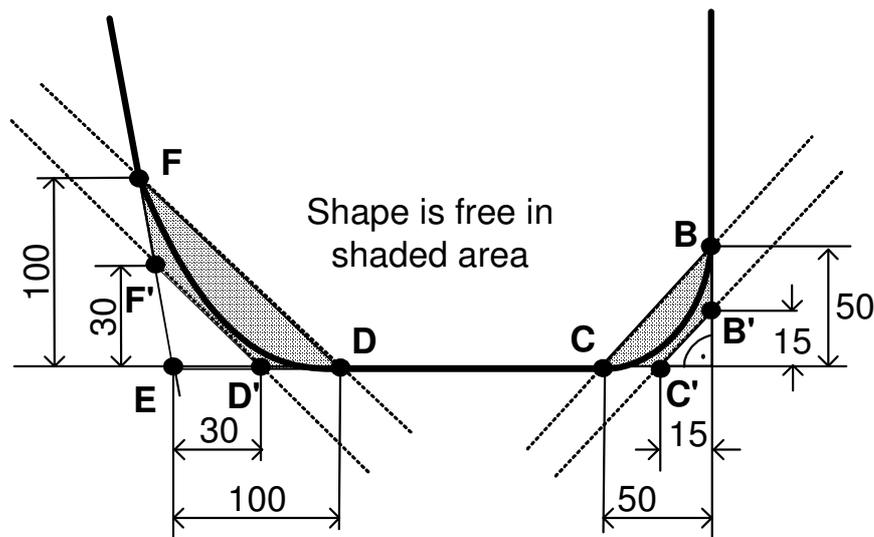
The shape of the lower corners of the centreboard shall lie within the shaded areas in the Figure “Centreboard Lower Edge Shape”, and no part of the bottom edge of the centreboard shall lie outside the polygon formed between points B, B', C', D', F' and F.

Point B' is the point on the x-axis 15mm from origin O.

Point C' is the point on the y-axis 15mm from origin O.

Point D' is the point on the y-axis 30mm from point E.

Point F' is the point on line (EG), 30mm from point E.



Centreboard Lower Edge Shape

C.9.5 WEIGHTS

	minimum	maximum
(1) Weight in dry condition excluding fittings	4.5 kg	6.5 kg
(2) Corrector weights are not permitted.		

C.9.6 CONDITIONS FOR USE

(a) No part of the **centreboard**, in its raised position, shall project below the **hull**.

C.10 RUDDER BLADE, STOCK AND TILLER

C.10.1 MATERIALS

- The **rudder** blade shall be made of one or a combination of the following materials; wood, plywood, polyester with glass fibre, epoxy with glass fibre and/or plastic foam, which includes micro balloons and may be painted.
- For boats first **certified** after 1st March 2002, the rudder stock and tiller shall be made of aluminium alloy and/or stainless steel.
- The rudder stock shall not act as an extension of the hull

C.10.2 FITTINGS

(b) OPTIONAL

- Control lines and two cleats may be used to fix the position of the rudder blade. One block per cleat is permitted.
- A bushing round the pivot of the rudder blade

	minimum	maximum
Distance from the centre of the pivot hole to the x-axis	93 mm	103 mm
Distance from the centre of the pivot hole to the y-axis	743 mm	763 mm
Distance from E to the x-axis	240 mm	260 mm
Total (positive, negative or both) deviation of an edge from a straight line:		
Between points A and B from the x-axis		2 mm
Between points C and D from line (CD)		2 mm
Between points F and G from line (FG)		2 mm

At no point the width of the rudder blade shall be more than 260mm or less than 240mm.

Line (AI) lies on the x-axis. Line (GH) is parallel to the x-axis. The length of the lines (AI) and (GH) is arbitrary. The contour of the rudder blade inside the area AGHI is free, but no part of the rudder shall lie outside this area.

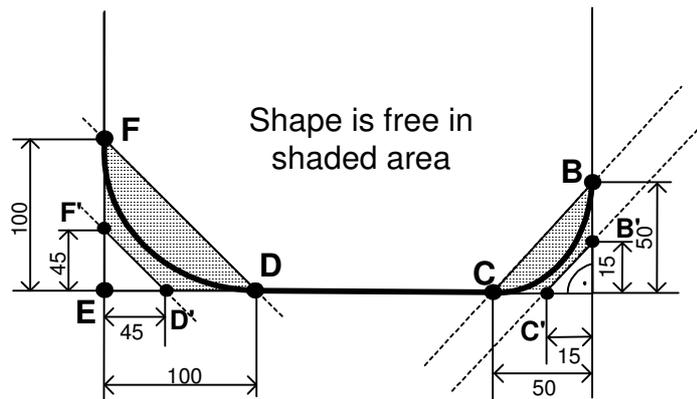
The shape of the lower corners of the rudder blade shall lie within the shaded areas in the Figure “Rudder Blade lower Edge Shape” and no part of the bottom edge of the rudder shall lie outside the polygon formed between points B, B’, C’, D’, F’ and F.

Point B’ is the point on the x-axis 15mm from origin O.

Point C’ is the point on the y-axis 15mm from origin O.

Point D’ is the point on the y-axis 45mm from point E.

Point F’ is the point on line (EG), 45mm from point E.



Rudder Blade Lower Edge Shape

C.10.5 WEIGHTS

	minimum	maximum
The rudder blade, dry, with control ropes only:		2.3kg

If the rudder blade is found to be underweight the difference shall be made up by corrector weights permanently fastened to the upper edge surface.

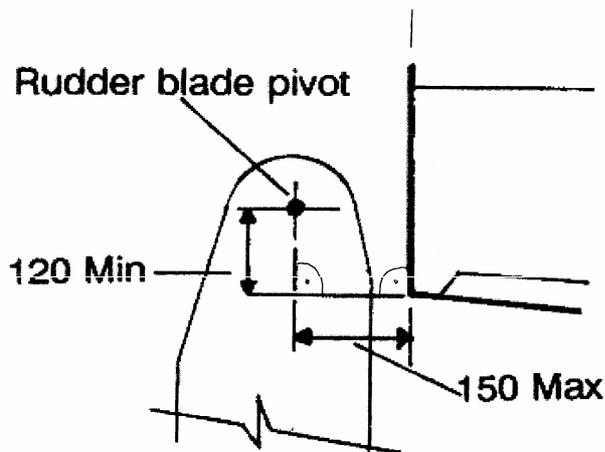
C.10.3 CONDITIONS FOR USE RUDDER

(a) The **rudder** blade shall be in its fully lowered position. However for races sailed in shallow water, the sailing instructions may prescribe that this rule shall not apply.

(b) RUDDER ASSEMBLY

The rudder consists of a rudder blade, a rudder stock and a tiller. The rudder blade shall be able to pivot around its axis. The rudder shall be detachable from the hull.

When mounted on the hull, the rudder blade pivot shall be located at a maximum of 150 mm abaft the transom and its height above the lower corner of the transom shall be a minimum of 120 mm, measured according to the Figure “Rudder Pivot Position”.



Rudder Pivot Position

C.11 RIG

C.11.1 LIMITATIONS

- (a) Only one mast, boom and spinnaker pole shall be used during an event except when an item has been lost or damaged beyond repair.

C.11.2 DEFINITIONS

- (a) **MAST DATUM POINT**

The **mast datum point** (MDP) is the **heel point**. Unless indicated otherwise, all measurements are from the MDP.

C.11.3 MANUFACTURER

- (a) **Spar** manufacturer is optional.

C.12 MAST

C.12.1 MATERIALS

- (a) The **spar** shall be of aluminium alloy.

C.12.2 CONSTRUCTION

- (a) The **spar** shall include a fixed sail groove or track, which may or may not be integral with the **spar**.

C.12.3 FITTINGS

- (a) **MANDATORY**

- (1) A goosneck
- (2) Kicking strap attachment
- (3) Spinnaker pole fitting.
- (4) Spinnaker pole downhaul blocks and/or sheave boxes with attachment.

- (5) Spinnaker pole lift blocks and/or sheave boxes with attachment.
- (6) A pair of fixed or adjustable metal **spreaders** with optional attachment systems which may include local reinforcement as per C.12.4
- (7) Headsail halyard block(s) and or sheave box(es).
- (8) Attachments for shrouds, forestay and trapezes.
- (9) Spinnaker halyard blocks and/or sheave boxes.
- (10) A sheave or sheave box and a rack lock or cleat for the mainsail halyard.
- (11) A device to ensure compliance with ERS B.9.1 (a) if the mainsail halyard system itself does not do so.
- (12) Permanently painted/taped **limit marks**.

(b) OPTIONAL

- (1) A heel fitting
- (2) A fitting for centreboard hoist blocks.
- (3) Mainsail halyard blocks and/or sheave boxes.
- (4) Headsail halyard cleat
- (5) Fitting(s) for Cunningham adjustment.
- (6) Reinforcement at mast partner as per C.12.4.
- (7) A removable timing device
- (8) Attachment fittings for removable compass.
- (9) A fitting to attach mainsail **tack** to **spar**
- (10) Devices attached to the **spreaders** to prevent the spinnaker halyard from getting tangled
- (11) A spinnaker crane which may include sheaves, blocks and/or fairleads for spinnaker halyard
- (12) A masthead fittings which may include a mainsail halyard sheave.
- (13) One mechanical wind indicator.

C.12.4 DIMENSIONS

	minimum	maximum
Mast spar deflection when loaded at 3500 mm from the mast datum point , and supported horizontally at the upper point and a point not more than 100mm from the heel:		
fore-and-aft (load 25kg)		200 mm
transverse (load 15kg)		130 mm
permanent bend fore-and-aft		40 mm
Mast spar cross section between MDP and 5010 mm;		
Transverse	55 mm	75 mm
Mast spar cross section between 1550 mm and 5010 mm;		
fore-and-aft	65 mm	75 mm

In this region the mast section shape and wall thickness excluding external luff groove shall be constant along the length of the spar. Reinforcement is permitted in the regions of the mast partner, spreaders and the connection if the mast is made of two parts. A cut-off for sail entry is permitted.

Mast limit mark width	10 mm	
Lower point height	1055 mm	
Upper point to the lower point	5750 mm	
Forestay height	4995 mm	5025 mm
Trapeze height	4910 mm	5110 mm
Shroud height	4995 mm	5025 mm
Spinnaker pole fitting:		
height	1240 mm	1260 mm
projection		40 mm
Spinnaker hoist height		5170 mm
Spinnaker halyard projection device, distance from spar		60 mm
Spreader height	2790 mm	2810 mm
The Distance between mast datum point and the intersection of the spar and the lower edge of the jib halyard, when at 90 ⁰ to the spar, each extended as necessary		
		4870 mm
Distance from mast datum point to centre of gravity in condition as described in ERS H.4.6. The rigging parts to be included in the measurement are those under C.15.2; C.16.2 (a). The trapeze system shall only include the wire and the grip. The ends of the halyards are to be left on the ground		
		2800 mm
Distance between the aft face of the mast and the gooseneck pivot		
		35 mm

C.12.5 WEIGHTS

The weight of the **mast** includes rigging specified under C.15.2; C.15.3 (a) (1), C.16.2 (a), fittings specified under C.12.3 and permanently fastened compass bracket if applicable, but without wind indicator, compass and/or timing device:

	minimum	maximum
Mast weight	10 kg	
Mast corrector weights		0.3 kg

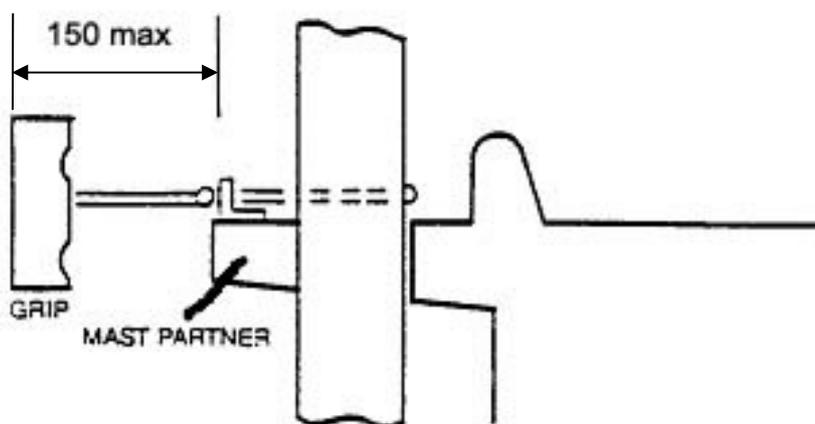
Corrector weights shall be permanently fastened so that no part of the corrector is more than 200mm from the **upper point**.

C.12.6 CONDITIONS FOR USE

(a) USE

- (1) The fore and aft bend of the mast **spar** may be controlled at the mast partner by one of the following devices:
 - (i) Chocks between the mast **spar** and the mast partner (forward of the mast).
 - (ii) Optional systems of ropes or wires which may include attachments, blocks, levers, grips and cleats, all located on top of the mast partner.

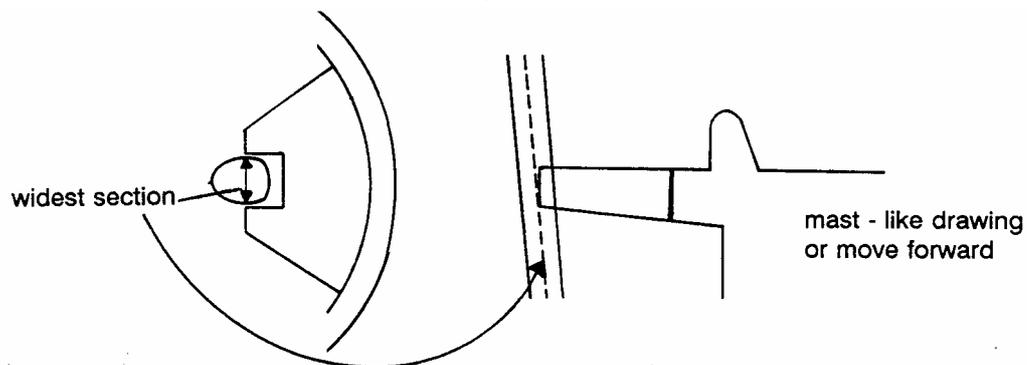
With the mast spar in its most forward position, the grip, end of rope, wire or other parts of the system of the aft bend control shall not be more than 150mm from the mast partner as Figure “Mast Controller Grip” shows:



Mast Controller Grip

With the mast in its aft most position the grip of the forward bend control shall not be more than 150mm from the mast partner.

- (2) The sideways play between the **mast spar** and the mast partner may be controlled by strips of any material permanently fastened to the mast partner.
- (3) The mast heel position shall not be adjusted when *racing*.
- (4) The forestay under tension shall be entirely in metal and shall prevent the mast from disengaging from the mast partners. To meet this requirement the widest section of the mast shall be within the mast partners when the mast rakes under its own weight and the forestay comes under tension, as Figure “Mast Rake with Tensioned Forestay” shows:



Mast Rake with Tensioned Forestay

- (5) Adjustable spreaders if used shall not be remotely controlled, and shall not be adjusted when racing.

C.13 BOOM

C.13.1 MATERIALS

- (a) The boom **spar** shall be of aluminium alloy.

C.13.2 CONSTRUCTION

- (a) The **boom** shall include a fixed aluminium sail groove or track which may or may not be integral with the **spar**.

C.13.3 FITTINGS

(a) MANDATORY

- (1) A gooseneck attachment.
- (2) A kicking strap fitting.
- (3) Mainsheet block(s) with attachment fitting(s) for the blocks and/or mainsheet which may be adjustable
- (4) Mainsail **clew** outhaul attachment or adjustment system.
- (5) A stopper to ensure compliance with C.17.4.(b).(4).
- (6) Permanently painted/taped **limit mark**.

(b) OPTIONAL

- (1) A fitting to attach mainsail **tack**
- (2) An aft **spar** end fitting
- (3) The **spar** may be protected in the area where it touches the shrouds by pieces of any material, with maximum length/height/thickness=100/50/5 mm.

C.13.4 DIMENSIONS

	minimum	maximum
Boom spar deflection when loaded with 80 kg at a point midway between points 100 mm from each end and with the groove uppermost: vertical		50 mm
Boom spar cross section vertical	54 mm	72 mm
transverse	38 mm	
Radius of convex edges excluding those of external or internal tracks or grooves.....		5 mm
Except within 150 mm from each spar end, the boom section shall be constant.		
Limit mark width		10 mm
Outer point distance		2650 mm

C.14 SPINNAKER POLE

C.14.1 MATERIALS

- (a) The **spar** shall be of aluminium alloy.

C.14.4 FITTINGS

(a) OPTIONAL

- (1) A hook at each end.
- (2) Fittings approximately at the mid-point for attachment for lift/downhaul.
- (3) A fixed line between the fittings described in C.14.4 (a) (1), which may incorporate knots, toggles or short tubes for easier handling.

C.14.5 DIMENSIONS

	maximum
Spinnaker pole length	1900 mm

C.14.6 CONDITIONS FOR USE

- (1) Only one spinnaker pole may be carried aboard.

C.15 STANDING RIGGING

C.15.1 MATERIALS

- (a) The standing **rigging** shall be of stainless steel wire rope. Rod rigging is prohibited.

C.15.2 CONSTRUCTION

(a) MANDATORY

- (1) A forestay of a diameter not less than 2.3 mm.
- (2) Two shrouds of a diameter not less than 2.3 mm.
- (3) The material of the trapeze line is optional, if wire rope is used it shall have a diameter not less than 2.3 mm. Each trapeze wire shall be provided with handholds, rings and adjustment. Self-tacking trapeze systems are not allowed.

(b) OPTIONAL

- (1) Elastic cords on the trapeze wires approximately at the height of the spreaders.
- (2) Shock-cord may be fitted between the forestay and the stemhead fitting, to maintain tension in the forestay.

C.15.3 FITTINGS

(a) MANDATORY

- (1) Forestay attachment fittings.
- (2) Each shroud shall be attached to the shroud plate by means of plates having rows of adjustment holes. No other arrangement of shroud adjustment is permitted.

C.15.4 CONDITIONS FOR USE

- (1) The effective length of the shrouds shall not be adjusted when *racing*.

C.16 RUNNING RIGGING

C.16.1 MATERIALS

- (a) Materials are optional except that Titanium is prohibited.

C.16.2 PARTS

(a) MANDATORY

- (1) Mainsail halyard
- (2) Headsail halyard
- (3) Spinnaker halyard
- (4) Spinnaker pole lift and downhaul

(b) OPTIONAL

- (1) Mainsail Cunningham line
- (2) Mainsail outhaul

C.16.3 FITTINGS

(a) OPTIONAL

- (1) One block or eye in each headsail Barber hauler to run on headsail sheet

- (2) One block or eye in each spinnaker Barber hauler to run on spinnaker sheet or guy.

C.16.4 CONDITIONS FOR USE

- (1) **Sails** and sheets may be moved directly by hand without the use of a block.

C.17 SAILS

C.17.1 MODIFICATIONS AND MAINTENANCE

- (a) Routine maintenance such as sewing, mending and patching is permitted without re-certification.

C.17.2 LIMITATIONS

- (a) Not more than one mainsail, one jib and one spinnaker shall be carried aboard when racing.
- (b) Not more than one mainsail, one jib and one spinnaker shall be used during an event, except when a **sail** has been lost or damaged beyond repair.

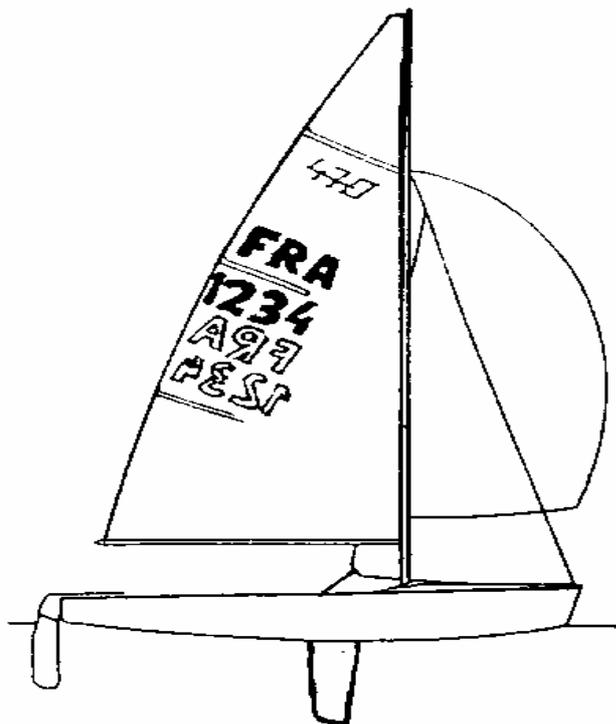
C.17.3 IDENTIFICATION

- (a) The mainsail and spinnaker shall carry as sail identification the national letters and sail number. The sail number to be carried on the sails shall correspond to the last four digits of the official sail number issued according to A.10. The national letters and sail numbers size and position shall comply with the RRS except where otherwise prescribed in these class rules.

C.17.4 MAINSAIL

(a) IDENTIFICATION

- (1) The sail identification shall be red, in paint or durable material, securely attached. It shall be placed as shown in the Figure “Sail Identification Location”, and so that the characters on one side of the sail do not overlap with characters on the other side, leaving at least 60 mm in between.



Sail Identification Location

- (2) Mainsails used in women's only events shall carry a red rhombus (length of diagonals minimum 240mm, maximum 260mm) above the top batten pocket on both sides. The position should be approximately in the centre of the triangle formed by the top batten and the mainsail head. The rhombus may be retained for racing in other events.
 - (3) The 470 mainsail insignia as per G.3.1 may be replaced by a gold version conforming to the same dimensions when at least one member of **crew** is an Olympic or World Champion.
- (b) USE
- (1) The **sail** shall be hoisted on a halyard. The arrangement shall permit hoisting and lowering of the **sail** at sea with the boat upright.
 - (2) **Luff** and foot bolt ropes shall be in the **spar** grooves or tracks.
 - (3) Battens shall be fitted, except in the case of accidental loss.
 - (4) The sail shall be set so that the highest visible point of it, projected at 90° to the mast spar, shall not be higher than the **upper point**; the aftmost visible part of the leech, projected at 90° to the boom, is forward of the **outer point** on the boom.

C.17.5 JIB

- (a) USE
- (1) The jib shall be hoisted and lowered on a halyard. The arrangement shall permit hoisting and lowering of the sail at sea with the **boat** upright.
 - (2) Only one luff wire of diameter not less than 2.3mm shall be fitted inside the jib luff sleeve.

C.17.6 SPINNAKER

- (a) IDENTIFICATION
- (1) Identification shall be of a contrasting colour to the body of the sail.
 - (2) As an alteration to RRS Appendix G, national letters may be positioned in line with the sail numbers.

Section D – Hull

D.1 GENERAL

D.1.1 RULES

- (a) The **hull** shall comply with the **class rules** and official plans in force at the time of initial **certification**, but all fittings, **hull appendages** and **rig** shall comply with the current rules.
- (b) For boats first **certified** after the 1st of March 1993, the hull shall be constructed in accordance with the Building Specification Plan and shall consist of the parts listed therein except where temporary alternatives have been approved for the builder by the ISAF in writing. All boats from any one builder shall be built to the same detailed specification submitted by the builder to ISAF.

D.1.2 CERTIFICATION

See Rule A.12.

D.1.3 DEFINITIONS

(a) HULL DATUM POINT

The **hull datum point** (HDP) is the projection of the AMP on the baseline.

(b) AFT MEASURING POINT

The aft measuring point (AMP) is the intersection on the hull centre plane of the transom external surface with the underside of the hull surface, both extended as necessary.

(c) FORWARD MEASURING POINT

The forward measuring point (FMP) is the **sheer** point on the stem, as shown in the Measurement References diagram.

- (d) Unless otherwise stated, all measurements shall be taken parallel to the baseline.

D.1.4 IDENTIFICATION

- (a) The **hull** shall carry the ISAF Plaque permanently attached to the starboard side tank close to the transom and bottom.
- (b) The **hull** shall carry, either moulded in or on a plate, permanently fixed, the builder's mark, serial number and mould number, which also appear on the certificate. In addition, the builder's serial number shall be moulded on the outside of the transom on the starboard side.

D.1.5 BUILDERS

- (a) The **hull** shall be built by a builder licensed by ISAF. **Hulls** shall be supplied only as permanently assembled boat units.
- (b) All moulds shall be approved by ISAF.
- (c) Application for a licence shall be made through a MNA to the ISAF. The licences shall include clauses requiring good standards of manufacture, compliance with class rules and plans and a guarantee that all fees shall be paid. The ISAF shall consult with 470 International before granting any licence and only sufficient licences will normally be issued in a country to ensure that demand is satisfied.

- (d) Alteration to plugs or moulds made without the approval of the ISAF shall result in the builder's licence being revoked. This same measure shall be taken in case of intentional and/or repeated infringements of the class rules, by the builder.

D.1.6 MATERIALS

- (a) Local reinforcement of GRP, wood, plywood or metal as backings for fittings may be added.

D.2 BUOYANCY TANKS

D.2.1 CONSTRUCTION

- (a) Buoyancy equipment shall comprise of two foam buoyancy blocks located in the side tanks, one piece in each tank. The minimum volume is 0.05 m³ each with a minimum length of 1500mm, according to the building specification.

D.3 ASSEMBLED HULL

D.3.1 FITTINGS

(a) MANDATORY

The following fittings shall be positioned in accordance with the Building Specifications unless otherwise noted:

- (1) Stemhead fitting.
- (2) Shroud plates.
- (3) Mainsheet track and/or metal reinforcement, which shall be straight.
- (4) Mast step, which may incorporate a means of fore and aft adjustment and which shall bear a mark 3055mm from the AMP engraved on the mast step or its mouldings. Additional dimensions for the mast step are mentioned in D.3.2.
- (5) Two rudder fittings, which shall include a device to prevent the rudder becoming detached, bolted to the transom.

(b) OPTIONAL

- (1) Jib and spinnaker halyard tensioning systems.
- (2) An aft and/or centre mainsheet system may be used. Fittings and the adjustment system are optional, except that if a hoop is used, it shall be of aluminium and/or stainless steel.
- (3) Mainsail Cunningham blocks, eyes, fairleads and cleats.
- (4) Kicking strap adjustment.
- (5) Headsail sheet blocks, fairleads and cleats.
- (6) Headsail tack adjustment system, consisting of a shackle on the stemhead fitting, one cleat mounted on the foredeck, one fairlead behind the cleat and a single piece of rope.
- (7) Fixed or adjustable jib sheet fairleads or pulleys. If traveller tracks are used, no more than one traveller car per track is permitted. Adjustment of the jib fairleads or pulleys may be remotely controlled only in one direction (e.g. fore/aft or in/out or up/down). Additional adjustments to the fairleads or pulleys are only permitted by means of prefixed positions.
- (8) Spinnaker sheet and guy fairleads, blocks and cleats.
- (9) Spinnaker sheet barber hauler fairleads, blocks and cleats.
- (10) Spinnaker pole uphaul/downhaul fairleads, eyes, blocks and cleats.

- (11) Toe straps fitted within the cockpit.
 - (12) Fittings for stowage of clips for paddle(s), spinnaker pole and other equipment
 - (13) Two self-bailers, with a total effective area not exceeding 12.5 cm².
 - (14) Spinnaker catcher device(s) which shall not project more than 150 mm beyond the bow or beyond the outboard edges of the gunwale.
 - (15) Sealing strips for the centreboard slot of optional material.
 - (16) Optional centreboard hoist system of pulleys, elastic cord and/or rope and cleats.
 - (17) Hinged covers or other devices for closing draining ports or drain holes in the transom. These covers or devices shall not obstruct the rudder or act as an extension of the bottom of the hull.
 - (18) A centreboard pivot including bush.
 - (19) Strips of a minimum length of 300mm to reduce friction and/or the distance between the centreboard and centreboard case, but no device shall be attached to the inside of the centreboard case that could cause the centreboard to gybe (angle to windward).
 - (20) Trapeze return system with elastic cord and blocks/fairleads.
- (c) Fittings may be attached to brackets not exceeding 175mm x 125mm fixed to the side tanks.
 - (c) No fittings, with the exception of spinnaker sheet catcher(s), rudder fittings and transom drainage flaps shall project beyond the outboard edges of the gunwale rubbing strips or beyond the profile of the hull,
 - (d) No fitting shall serve as an extension of the hull surface.
 - (e) Control lines and/or sheets shall not pass through the buoyancy compartments or the breakwater.
 - (f) **Ballast** shall not be carried.
 - (g) Materials for permitted fittings are optional except that Titanium is prohibited.

D.3.2 DIMENSIONS

The keel line shall be taken as the intersection line from transom to stem of the hull shell and the hull centerplane.

The sections shall be taken as vertical, transverse planes at the following positions:

Section 1: at 500 mm from **hull datum point**.

Section 3: at 1500 mm from **hull datum point**.

Section 5: at 2500 mm from **hull datum point**.

Section 7: at 3500 mm from **hull datum point**.

Section 8: at 4000 mm from **hull datum point**.

The baseline shall be on the centerplane of the **hull** at the following vertical distances:

at the **hull datum point**: 230 mm from the AMP

at section 8 : 114 mm from the hull shell.

	minimum	maximum
Length of hull between AMP and FMP.....	4690 mm	4710 mm
Vertical distance from baseline to underside of hull shell;		
at section 1	174 mm	182 mm

at section 3	92 mm	104 mm
at section 5	54 mm	68 mm
at section 7	72 mm	80 mm
Longitudinal distance from hull datum point		
to centre of shroud plate holes:	2770 mm	2790 mm
Fore and aft position of aft edge of the mast, projected from above the sail entry at step level from hull datum point		
	3055 mm	3115 mm
Mast step bearing surface above the keelson when fitted.....		
		5 mm
Mainsheet track and/or metal reinforcement shall be attached to the top of the centerboard case and mounted at a distance from the hull datum point of.....		
	1610 mm	1650mm
Inside diameter of buoyancy tank inspection holes	110 mm	160 mm
Inside diameter of buoyancy tank draining holes	10 mm	25 mm

D.3.3 WEIGHT

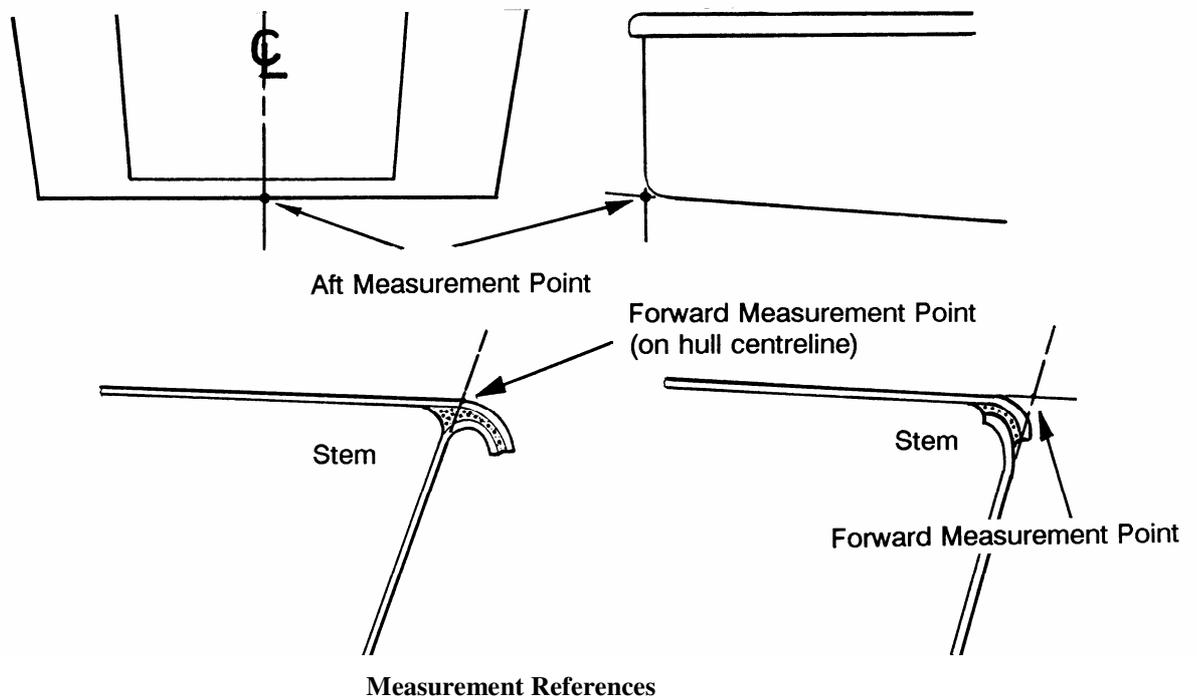
	minimum	maximum
Hull weight (refer to building specification).....	86.0 kg	... kg

D.4 MEASUREMENT DIAGRAMS

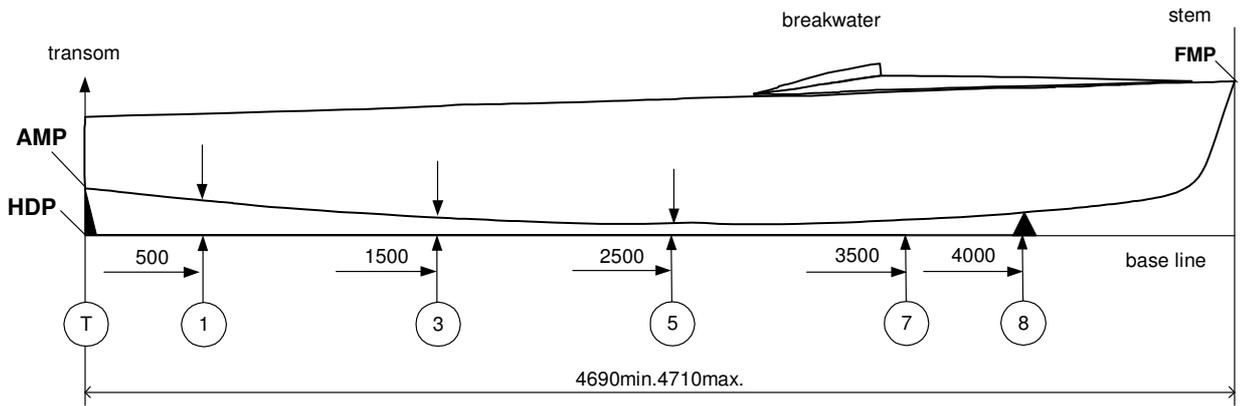
Note:

- (1) This part of the Class Rules makes reference to the Building Specification Plan.
- (2) Only templates supplied by ISAF shall be used for hull measurement.

D.4.1 HULL DATUM POINT



For measurement, the hull rests at a distance of 230 mm at the HDP and at a distance of 114 mm at Station 8 on the baseline, as Figure “Hull Measurement” shows.

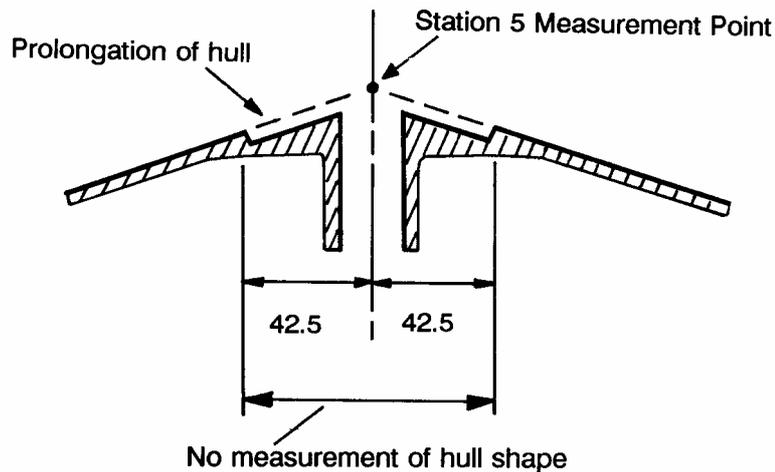


Hull Measurement

All measurements carried out from the **hull datum point** are parallel to the baseline.

The keel is measured at the following Stations: T, 1, 3, 5, 7, and 8 located on the baseline at 0 mm, 500mm, 1500mm, 2500mm, 3500mm and 4000mm respectively from the HDP.

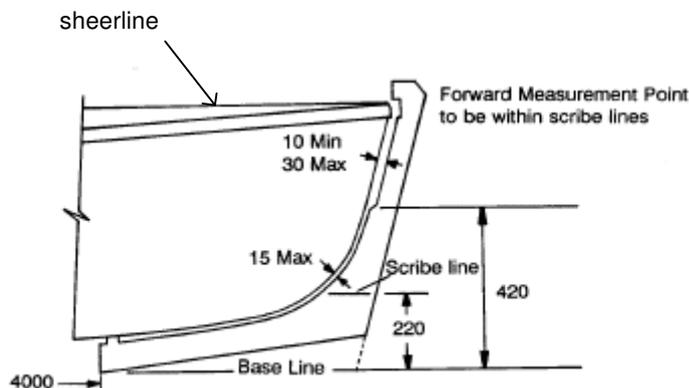
Since Station 5 corresponds to the middle of the centreboard box, the distance to the baseline is measured to the prolongation of the hull, as Figure “Section 5 measurement” shows.



Section 5 Measurement

D.4.2 STEM

The stem template shall be applied as shown on the measurement diagram

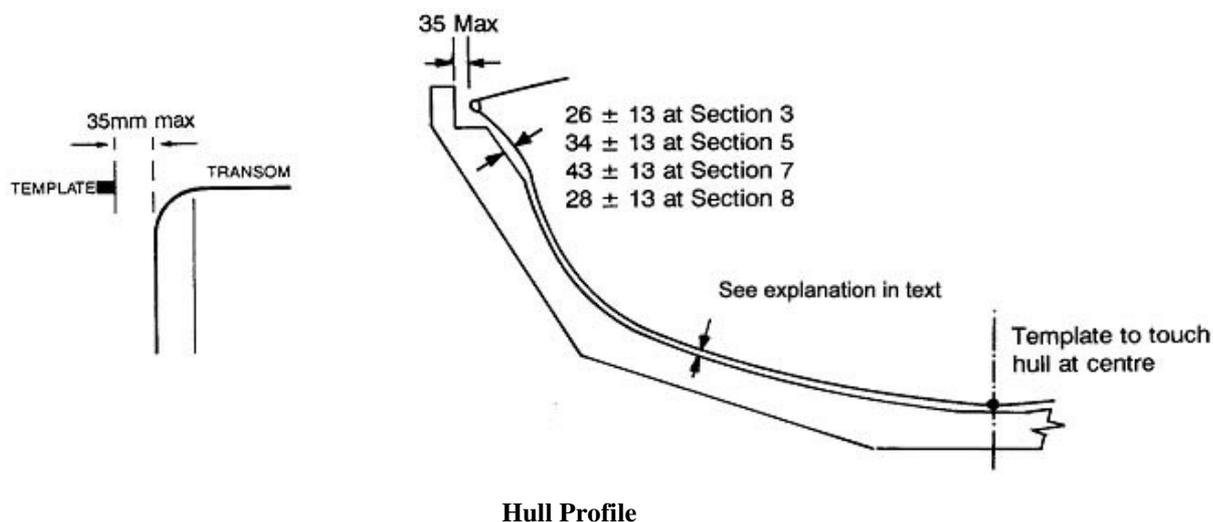


Between the sheerline and a point 420mm above the baseline the template shall clear by not less than 10mm nor more than 30mm.

Below the 420mm point the template shall touch lightly or clear by not more than 15mm.

D.4.3 ATHWARTSHIPS

Templates for the transom and section 1, 3, 5, 7 and 8 shall be applied as shown on the measurement diagram.



Hull Profile

The top of the deck at the sheerline shall not be more than 10mm above or below the sheer marks on the templates.

The templates shall touch the gunwale rubbing strakes lightly or clear by not more than 35mm. At the transom the distance to the template shall be defined as shown in the diagram.

Below the points 420mm above the baseline the clearance between the hull and the templates shall be between 5mm and 15mm at the transom and between 3mm and 17mm at sections 1, 3, 5, 7 and 8.

The difference between the maximum and minimum clearances shall not exceed 7mm at the transom and 10mm at the other sections.

Above the line 420mm above the baseline, the maximum distance of the surface of the hull from the templates shall be 26mm ± 13mm at section 3, 34mm ± 13mm at section 5, and 43mm ± 13mm at section 7.

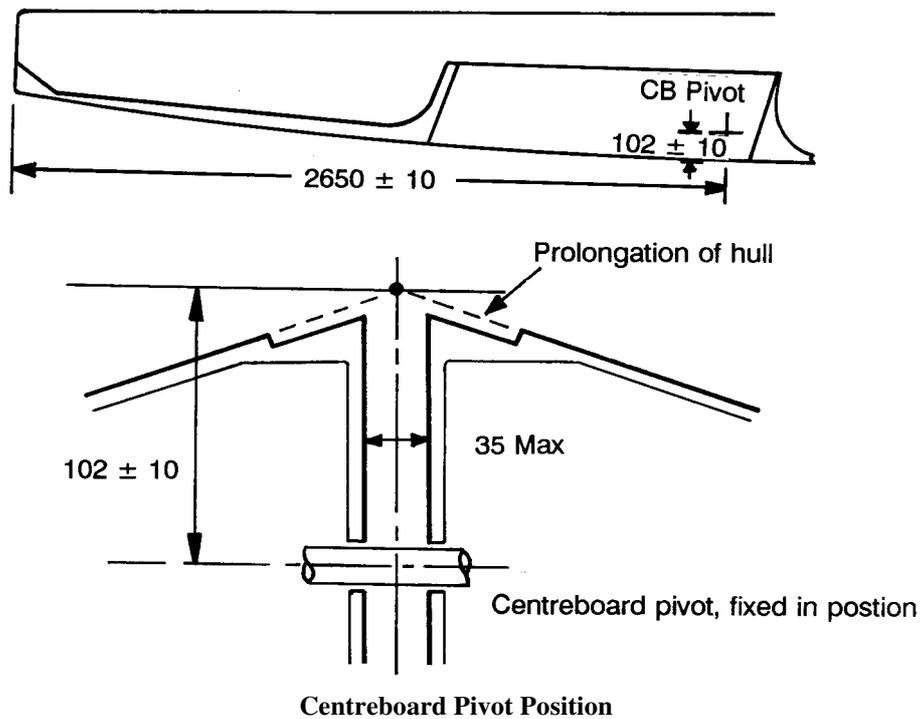
At section 8 from the template above the line 520mm above the baseline the maximum distance of the surface of the hull shall be 28mm ± 13mm.

The measurer shall test the surface of the hull with a flexible batten to ensure that the shape is fair.

D.4.4 CENTREBOARD PIVOT

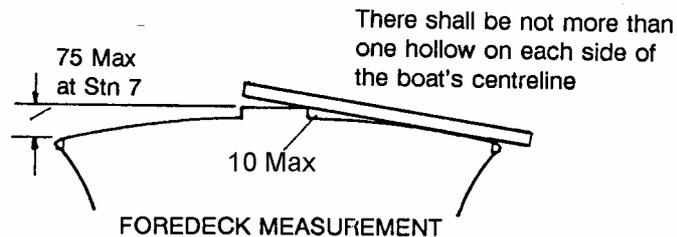
The distance of the centre of the centreboard pivot from the HDP shall be 2650mm ± 10mm and its height above the baseline shall be 102mm ± 10mm.

The pivot pin shall pass through the centreboard box and be in a fixed position.



D.4.5 FOREDECK

At section 7, the centre of the foredeck shall be not more than 75mm above the top of the deck at the sheerline.



A straight edge placed on the centreline of the foredeck shall be nowhere more than 5mm from the deck.

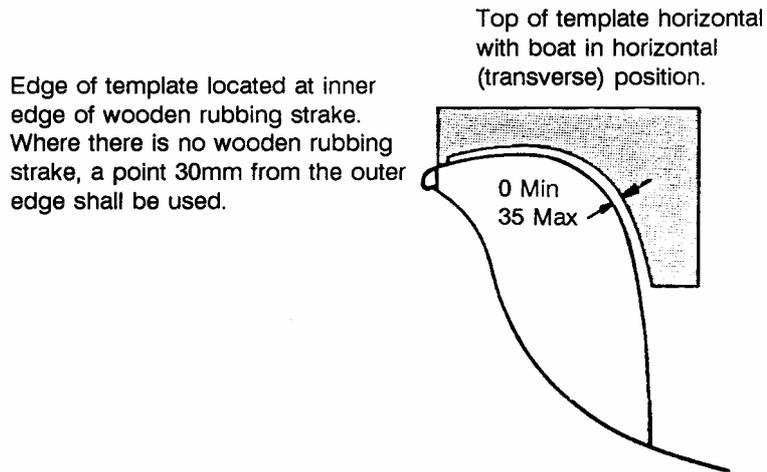
At the centreline the aft face of the breakwater shall be 3250mm ± 30mm forward of the HDP and at the sheer 2830mm ± 30mm.

D.4.6 SIDE TANKS

The shape of the side tanks surface above 280mm from the hull is measured by a template at Station 4.

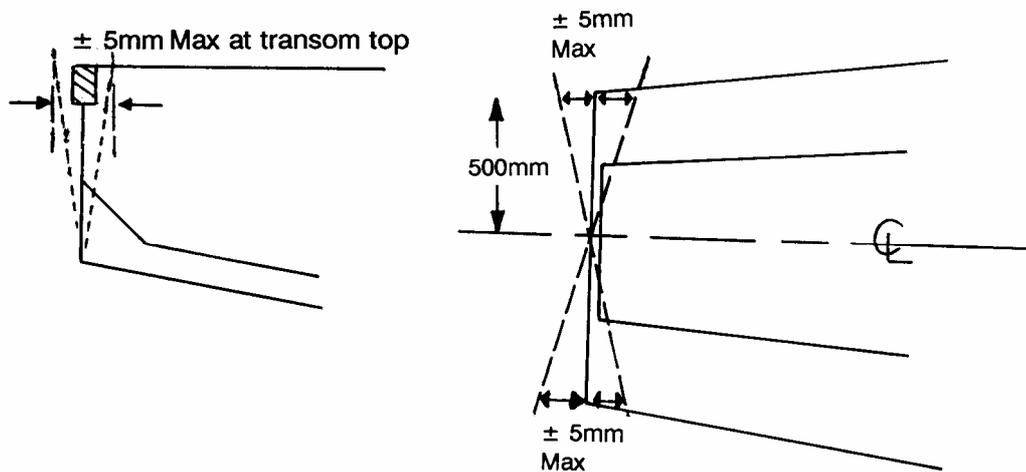
The template shall touch the tank lightly or clear by not more than 35mm.

The distance between the tanks (intersection with the hull shell) shall be verified at the transom (580mm), at Station 4 (830mm), and at Station 6 (770mm) with a tolerance of ± 30mm.



D.4.7 TRANSOM

The transom surface shall be perpendicular to the baseline, with the vertical and horizontal tolerances defined in the Figure “Transom tolerances”.



Transom Tolerances

Section E – Hull Appendages

Not in use see Section C for hull appendage items

Section F – Rig

Not in use see Section C for rig items

G.3.2 MATERIALS

- (a) The **ply** fibres shall be of polyester.
- (b) Battens shall be made of any material.

G.3.3 CONSTRUCTION

- (a) The construction shall be: **soft sail, single ply sail.**
- (h) The **body of the sail** shall consist of the same white **woven ply** throughout except for the panel adjacent to the **foot**, which may be of a different white **woven ply.**
- (i) The **sail** shall have three **batten pockets** in the **leech.**
- (j) The **leech** shall not extend aft of straight lines between:
 - (1) the **aft head point** and the intersection of the **leech** and the upper edge of the nearest **batten pocket,**
 - (2) the intersection of the **leech** and the lower edge of a **batten pocket** and the intersection of the **leech** and the upper edge of an adjacent **batten pocket** below,
 - (3) the **clew point** and the intersection of the **leech** and the lower edge of the nearest **batten pocket.**
- (e) The following are permitted: Stitching, glues, tapes, bolt ropes, corner eyes, headboard with fixings, Cunningham eye or pulley, **batten pocket patches** which may be made from a **woven ply** thinner than that of the body of the sail, batten pocket elastic, top batten pocket end cap at luff end and tensioning device at leech end, leech line with cleat on leech, not more than two **single ply windows**, one boom slide fixed at the **clew**, tell tales, sail shape indicator stripes, sail identification, sailmaker labels, sail button/sticker, **certification mark.**

G.3.4 DIMENSIONS

	minimum	maximum
Leech length		6265 mm
Quarter width		2340 mm
Half width		1790 mm
Three-quarter width		1050 mm
Top width		140 mm
Thickness of ply of the body of the sail	0.165 mm	
Primary reinforcement		325 mm
Secondary reinforcement:		
from sail corner measurement points		1000 mm
from the leech		300 mm
area above top batten pocket		unlimited
Distance from clew point to foot bolt rope		60 mm
Distance from tack point to foot bolt rope		300 mm
Total area of Windows		0.3 m ²
Window to sail edge	150 mm	
Extension of headboard from head point		140 mm
Batten pocket inside length: (Intermediate and lowermost pockets)		800 mm
Intersection of a batten pocket centreline and leech to adjacent cross width measurement point		100 mm

Head point to intersection of **luff** and centreline of uppermost **batten pocket** when the luff is under sufficient tension to remove wrinkles1680 mm 1780 mm

G.4 HEADSAIL

G.4.1 MATERIALS

- (a) The **ply** fibres shall be of polyester.
- (b) Battens shall be made any material

G.4.2 CONSTRUCTION

- (a) The construction shall be: **soft sail, single ply sail**.
- (b) The **body of the sail** shall consist of the same white **woven ply** throughout.
- (c) The headsail shall have a maximum of three **batten pockets** in the **leech**.
- (d) The **leech** shall not extend beyond a straight line from the aft **head point** to the **clew point**.
- (e) The following are permitted: Stitching, glues, tapes, tabling, corner eyes, **flutter patches, batten pocket patches** which may be made from a **woven ply** thinner than that of the body of the sail, not more than two **single ply windows**, tell tales, sail shape indicator stripes, sail identification, sailmaker labels, sail button/sticker, **certification mark**.

G.4.3 DIMENSIONS

	minimum	maximum
Luff length		4100 mm
Leech length		3750 mm
Foot length		1955 mm
Foot median		3950 mm
Top width		30 mm
Foot irregularity		30 mm
Thickness of ply of the body of the sail	0.165 mm	
Primary reinforcement		275 mm
Secondary reinforcement:		
from sail corner measurement points		750 mm
for 1 chafing patch on the luff		
along the luff		300 mm
perpendicular to the luff		50 mm
Total area of Windows		0.3 m ²
Window to sail edge	150 mm	
Batten pocket inside length:		250 mm

G.5 SPINNAKER

G.5.1 MATERIALS

- (a) The **ply** fibres shall be of polyester or nylon.

G.5.2 CONSTRUCTION

- (a) The construction shall be: **soft sail, single ply sail**.
- (b) The **body of the sail** shall consist of the same **woven ply** material throughout.

- (c) The following are permitted: Stitching, glues, tapes, corner eyes, tape eyes, tell tales, sail shape indicator stripes, sail identification, sailmaker labels, sail button/sticker, **certification mark**.

G.5.4 DIMENSIONS

	minimum	maximum
Leech lengths		4360 mm
Foot length		3000 mm
Foot Median		5100 mm
Difference between diagonals		50 mm
Upper width (upper leech points at 200 mm from head point)		350 mm
Half width		3450 mm
Three-quarter width		1830 mm
Primary reinforcement		300 mm
Secondary reinforcement		unlimited

OFFICIAL PLANS

1	Building Specification Plan	2009
2	Lines Plan	1964
3	Class Emblem (Full size)	1992
4	Full Size Sections	1964
5	Full Size Sections	1964
6	Full Size detail of Stem	1964

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