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# Class Rules

## International Finn Class Association



The Finn was designed in 1949 by Rickard Sarby and has been used at the Olympic Games since 1952.

sport / nature / technology



World Sailing  
Class Association



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# INTRODUCTION

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*FINN hulls, hull appendages, rigs and sails are measurement controlled.*

*FINN mast spars and sails shall be measured before leaving the manufacturer. The rules provide an option for using an approved in-house measurer.*

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

*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.*

## PLEASE REMEMBER:

THESE RULES ARE **CLOSED CLASS RULES** WHERE IF IT DOES NOT SPECIFICALLY SAY THAT YOU MAY – THEN YOU SHALL NOT.

COMPONENTS, AND THEIR USE, ARE DEFINED BY THEIR DESCRIPTION.





# PART I – ADMINISTRATION

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## 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 These **class rules** shall be read in conjunction with the ERS and the RRS.
- A.1.4 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.2 ABBREVIATIONS

- A.2.1 WS World Sailing
- MNA Member National Authority
- IFA International Finn Association
- NFA National Finn Association
- ERS Equipment Rules of Sailing
- RRS Racing Rules of Sailing

### A.3 AUTHORITIES AND RESPONSIBILITIES

- A.3.1 The international authority of the class is World Sailing which shall co-operate with the IFA in all matters concerning these **class rules**.
- A.3.2 No legal responsibility with respect to these **class rules**, or accuracy of measurement, rests with:
  - World Sailing,
  - the MNA,
  - the IFA,
  - an NFA,
  - the **certification authority**,
  - an **official measurer**.No claim arising from these **class rules** can 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 World Sailing.

### A.4 ADMINISTRATION OF THE CLASS

- A.4.1 The administering and **certification authority** is the IFA. The **certification authority** may delegate part or all of its functions, as stated in these **class rules**, to an IFA approved **official measurer**. A listing of IFA approved **official measurers** is available on the IFA website or from the class secretary.



## **A.5 NOTICE OF RACE AND SAILING INSTRUCTIONS**

- A.5.1 At Events of World Championship Grade and of Grade 1, the Notice of Race/Sailing Instructions may vary these **class rules** only with the agreement of the IFA and the World Sailing.
- A.5.2 At other Open Events, the Notice of Race/Sailing Instructions may vary these **class rules** only with the agreement of the NFA.

## **A.6 CLASS RULES AMENDMENTS**

- A.6.1 Amendments to these **class rules** shall be proposed by the IFA and require approval by World Sailing in accordance with World Sailing Regulations. The class procedure is at Appendix H.4.
- A.6.2 The Notice of Race or Sailing Instructions may state a higher recommended windspeed of 12 kts for rule C.1.1(2).

## **A.7 CLASS RULES INTERPRETATIONS**

### **A.7.1 GENERAL**

Interpretation of **class rules** shall be made in accordance with World Sailing Regulations. The class procedure is at Appendix H.4.

### **A.7.2 AT AN EVENT**

Any interpretation of **class rules** required at an event may be made by an international jury constituted in accordance with the RRS. The international jury should consult with the IFA Technical Committee and class representatives. Such interpretation shall only be valid during the event and the organising authority shall, as soon as practical after the event, inform the IFA, the MNA and World Sailing. The class procedure is at Appendix H.4.

## **A.8 INTERNATIONAL CLASS FEE(S) AND WORLD SAILING PLAQUE NUMBER**

- A.8.1 The builder shall pay the International Class Fee on every hull built, whether or not it is subsequently measured and registered. Payment shall be made to World Sailing, which will transfer the agreed amount to the IFA.
- A.8.2 World Sailing shall, after having received the International Class Fee for the hull, send the ISAF/World Sailing Hull Plaque to the hull builder.
- A.8.3 The ISAF/World Sailing Hull Plaque number shall not be changed.
- A.8.4 If the ISAF/World Sailing Hull Plaque is excessively damaged or missing, a replacement plaque shall be obtained from World Sailing. World Sailing shall notify the Class Association when a replacement sticker is issued.



## A.9 SAIL NUMBERS

A.9.1 A **boat** may sail under the **crew National Sail Letters** and:

- (a) her original ISAF/World Sailing Plaque Number, or
- (b) a **sail** number issued by the owner's NFA, for each NFA the numbers issued shall be in consecutive order, or
- (c) a Personal **Sail** Number issued by the owner's NFA.

A.9.2 If the use of a personal **sail** number is likely to cause confusion, a *race committee* may require that a **boat** use another **sail** number.

## A.10 CERTIFICATION AND MEASUREMENT RECORDS

A.10.1 The required **certificates** shall be:

- (a) One measurement **certificate**, and;
- (b) One measurement form, and;
- (c) mast card(s)

A.10.2 **Certification control** shall be carried out by an IFA approved **official measurer** who shall complete the appropriate documentation. A list of IFA approved **official measurers** is available in the class website: [www.finnclass.org](http://www.finnclass.org)

A.10.3 From 1 March 2013, **hulls** and **centreboards** undergoing initial **certification** measurement shall have their identification and measurement information entered on the IFA database.

## A.11 VALIDITY OF CERTIFICATES

A.11.1 A **certificate** becomes invalid upon:

- (a) the change to any items recorded on the **certificate**, unless updated as per rule A.12.2, or;
- (b) withdrawal by the **certification authority**, or;
- (c) the issue of a new **certificate**.

## A.12 RE-CERTIFICATION

A.12.1 The **certification authority** may issue a **certificate** to a previously certified boat:

- (a) when it is invalidated under A.11.1(a) or (b), after receipt of the old **certificate**, and **certification** fee if required.
- (b) when it is invalidated under A.11.1 (c), at its discretion.
- (c) in other cases, by application of the procedure in A.10.

A.12.2 The **certification authority** may update a **certificate** to a previously certified **boat** by crossing out the outdated **certificate** and attaching Reweighing forms signed by IFA approved **official measurers** to the current **certificate**.



## A.13 OLD BOATS

- A.13.1 The following rules always apply: C.9.4, D.9 (except those related to gunwale rubbing strakes), E.2.5 (b), G.1.
- A.13.2 Subject to A.13.1, a **hull** or other equipment not complying with current **class rules**, but complying with the **class rules** in force at a previous **certification control**, may retain **certification**, provided that the non-compliance does not give a racing advantage to the **boat**.
- A.13.3 In particular, Rule A.13.2 can be applied with respect to hull materials, centreboard thickness, centreboard coating, centreboard arm dimensions, centreboard weight, rudder hangings, gunwale rubbing strakes, mast centre of gravity, mast bearing diameters and boom attachment arrangement. If Rule A.13.2 is applied with respect to the boom attachment arrangement, then a mast **lower limit mark** must be made, complying with the older class rules (860 mm above the heel, width minimum 13 mm).
- A.13.4 All alterations involving removal of weight including correctors must be made under the supervision of an IFA approved **official measurer**, who shall issue a signed Reweighing Form for the **certification authority** to update the **certificate**.
- A.13.5 Weight may be removed if the **hull** and **centreboard** are then re-weighed and retested together using the Lamboley Test.
- A.13.6 As an exception, If the initial distance  $\lambda$  is greater than 2110 mm, a simple magnetic compass and its mounting may be removed, and corrector weight may be removed from a position between 1000mm and 2100mm longitudinally from the Hull Datum Point. The **hull** with **centreboard** shall then be re-weighed. If the measurer has reasonable doubt about whether Rule D.9.3 (c) may be contravened, he shall require compliance with A.13.5.



## Section B – Boat Eligibility

For a **boat** to be eligible when *racing*, the rules in this section shall be complied with.

### B.1 CLASS RULES AND CERTIFICATION

B.1.1 The **boat** shall:

- (a) be in compliance with the **class rules**,
- (b) have valid **certificates**. Certificates shall be held by the **crew** and shall be available upon request of the **certification authority**.
- (c) have valid **certification marks** as required.

### B.2 CERTIFICATION MARKS

B.2.1 The mast shall carry a valid sticker and have a valid mast card.

B.2.2 The sail shall have a valid IFA sail label attached near the tack.

B.2.3 The Centreboard, Rudder and Boom shall carry valid **certification marks**.

### B.3 CLASS ASSOCIATION MEMBERSHIP

B.3.1 The owner must be a member of IFA.



## PART II – REQUIREMENTS AND LIMITATIONS

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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 **certification control**.

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

### Section C – Conditions for Racing

*Rules that are not part of certification control are placed in this section. The reason could be either that compliance with the rule could only be checked at an event or that checking requires access to one or more parts that are individually certified.*

#### C.1 GENERAL

##### C.1.1 RULES

- (1) RRS 42.3 is changed by adding: The Race Committee may signal in accordance with RRS Appendix P5 that pumping, rocking and ooching are permitted after the starting signal, except when the boat's proper course is close-hauled or above. This changes rules 42.2(a), 42.2(b) and 42.2(c).
- (2) The Finn Class recommends that race committees apply Rule C.1.1 (1) in winds of 10 knots and above, measured at deck level on a race committee boat at the windward mark. See also A.7.2.
- (3) In accordance with RRS 43.1(b), the maximum weight for a competitor's clothing and equipment is increased from 8kg to 10kg.

#### C.2 CREW

##### C.2.1 LIMITATIONS

The **crew** shall consist of 1 person.

#### C.3 PERSONAL EQUIPMENT

##### C.3.1 TOTAL WEIGHT

See Class Rule C.1.1(3)

#### C.4 ADVERTISING

##### C.4.1 LIMITATIONS

Advertising shall only be displayed in accordance with the World Sailing Advertising Code. (See World Sailing Regulation 20)





## **C.5 BOAT EQUIPMENT**

### **C.5.1 FOR USE**

#### **(a) Mandatory**

- (1) Anchor and anchor warps if required by the Notice of Race and/or Sailing Instructions.

#### **(b) Optional**

- (1) Electronic or mechanical timing devices.
- (2) Magnetic compasses having no electronics.
- (3) One electronic self-contained compass, using magnetic input. If electronic, the compass may have only heading and timing functions. The display letters and numerals shall be not more than 30 mm high.

The display may show only the following:

- heading (damping may be adjusted manually),
- heading  $\pm$  a tacking angle (which may be adjusted manually),
- time,
- race timing information,
- identification,
- battery condition, system error, adjustment and calibration information.

Race timing information may be transmitted by sound. The electronic compass shall not deliver, store or correlate information in any way except as described here.

- (4) Electronic heart rate monitor devices.
- (5) Other equipment and fittings normally carried in boats such as hand bailers, buckets, flags, mechanical wind indicators, anchors and anchor warps, fenders, bags, bottles, manual recorders, writing equipment and spares.

### **C.5.2 NOT FOR USE**

#### **(a) Mandatory**

- (1) Towing rope minimum 8 m long of not less than 8 mm in diameter, capable of floating. The towing rope must be readily available without contravening Rule C.6.1 (b).

#### **(b) Optional**

- (1) One paddle.



## C.6 BOAT

### C.6.1 FLOTATION

- (a) Buoyancy shall ensure that in the event of complete flooding, a fully rigged boat with intact buoyancy units will float approximately level.
- (b) It is the owner's responsibility to see that the buoyancy apparatus is kept securely fastened and fully effective when afloat. Hatch covers and drainage plugs for buoyancy units shall be kept in place at all times.
- (c) **Official Measurers**, Race Committees or Juries may require that a buoyancy test be satisfactorily completed at any time.

### C.6.2 LIMITATION

When this rule is invoked in the NoR or Sailing Instructions, the following equipment limitations shall apply:

Not more than 1 hull with 1 centreboard, 1 mast, 1 boom, 1 rudder and 2 sails may be used during an event. When an item has been lost or damaged beyond repair the race committee may approve additional equipment.

## C.7 HULL

### C.7.1 MODIFICATIONS AND MAINTENANCE

- (a) The hull shell, decks, bulkheads and double bottom (if fitted) shall not be altered in any way except as permitted by these **class rules**.
- (b) Holes not bigger than necessary for the installation of fittings and passage of lines may be made in decks and bulkheads, but not for the passage of lines through buoyancy units.
- (c) Routine maintenance such as painting and polishing is permitted without re-measurement and re-**certification**.
- (d) If any hull moulding is repaired in a way that might cause Rules C.6.1 or D.9 to be contravened, an **official measurer** shall satisfy himself that the equipment remains within the rules. The **official measurer** shall also describe the details of the repair on the **certificate**.
- (e) The lower part of the moulded centreboard slot may be filled where the lowered centreboard leaves a gap.

### C.7.2 WEIGHT AND WEIGHT DISTRIBUTION

After completion of **certification control**, if fittings or other items are moved in a way that might cause Rules D.9.2 and D.9.3 to be infringed, Rule A.13.1 shall apply and a new **certification control** under Rules D.9.2 and D.9.3 is required.

### C.7.3 FITTINGS

- (a) The **mast** bearings may be adjustable for position fore and aft when not *racing*, but any adjustable or movable part, whether permanently part of the step or not, shall always be forward of Station 7.
- (b) The fore-and-aft movement at the masthead due to play at the deck and heel bearing systems, shall not exceed the amount measured as follows:



With the boat held stern down, a light line shall be rigged at a constant tension from the masthead halyard sheave to the top of the transom. The **mast** shall be pushed maximum forward and maximum aft to take up play at the bearings. The difference in the distance from the masthead to the transom shall not exceed 10 cm.

- (c) Hiking pads, attached to but removable from the **hull** are permitted. They shall extend not more than 10 mm outboard of the vertical plane of the gunwale rubbing strake.
- (d) Standing rigging is prohibited.
- (e) Other fittings are permitted, subject to:
  - (1) The fitting shall cause no other rule to be infringed.
  - (2) It shall be possible to remove a fitting without damaging the structure.
  - (3) Holes and recesses may be cut to receive a fitting.
  - (4) Fittings shall have a reasonable weight, which must not be for the alteration of the boat's weight distribution.
  - (5) Fittings having a significant effect on the **hull** weight distribution shall be recorded on the measurement **certificate**.

## C.8 CENTREBOARD AND RUDDER

### C.8.1 MAINTENANCE

Routine maintenance such as painting and polishing is permitted without remeasurement and re-**certification**.

### C.8.2 LIMITATIONS

- (a) Only one **centreboard** shall be used during an event, except when a **centreboard** has been lost or damaged beyond repair.
- (b) See C.6.2.

### C.8.3 CENTREBOARD

#### (a) Use

There shall be an arrangement to prevent the **centreboard** from retracting completely if the boat is upside down.

### C.8.4 RUDDER

#### (a) Use

- (1) There shall be a fitting to prevent the **rudder** from falling off if the boat is upside down.
- (2) Except as allowed in (3) below, lifting rudder blades shall be pinned or bolted so that the rudder assembly complies with E.3.4.
- (3) A NA or Race Committee may allow lifting of the rudder blade if local conditions justify it and it is clearly stated in the Notice of Race and the Sailing Instructions.



## C.9 RIG

### C.9.1 MAINTENANCE

Routine maintenance such as painting and polishing is permitted without re-measurement and re-**certification**.

### C.9.2 LIMITATIONS

See C.6.2.

### C.9.3 MAST

#### Use

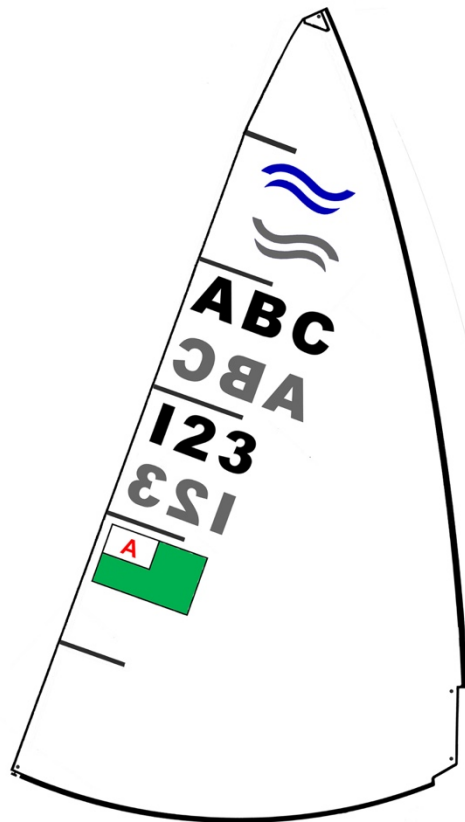
- (1) The **spar** shall be fitted in such a way that it will not come out of the step when the boat is capsized.
- (2) Except for normal sail controls, arrangements to introduce pre-bend or twist, or to vary the stiffness of a mast during the race are prohibited.
- (3) EITHER a stop shall be fitted so that Rule C.10.4 (c) cannot be contravened  
OR a halyard lock arrangement fitted within 1m of the **upper point** shall be used.

### C.9.4 BOOM

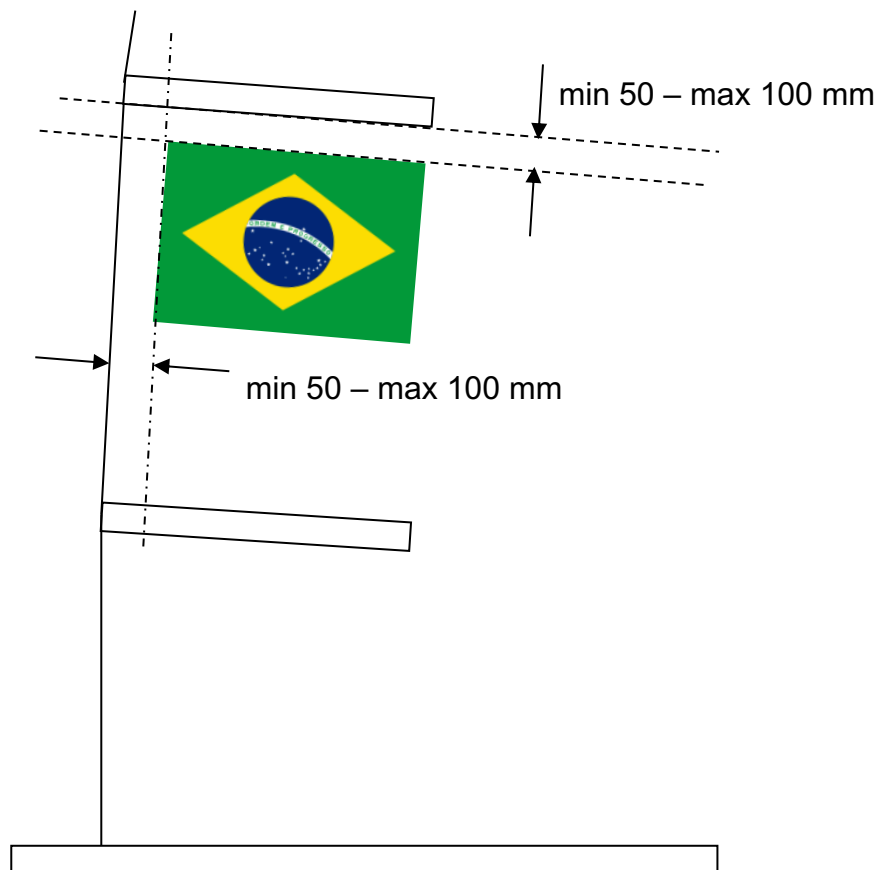
(a) <b>Dimensions</b>	minimum	maximum
<b>Limit mark width</b> .....	13 mm	
Boom <b>Outer Point</b> from aft edge line .....	3270 mm	

#### (b) Use

- (1) The boom shall be fitted to the mast so that all parts rotate together. Arrangements allowing over rotation of the mast are prohibited.
- (2) Mainsheet and Mainsheet block attachments on the boom allowing additional athwartship travel are prohibited.
- (3) A stop shall be fitted so that rule C.10.4 (d) cannot be contravened.
- (4) If an IFA approved **official measurer** finds that the diameter of a Boom Pin Hole exceeds the stated maximum, he may approve the Equipment Item if he is satisfied that the error is the result of fair wear and tear in service, that it does not improve the performance of the boat, and that Rule C.9.4 (b) (3) is satisfied.



### C.10.3. AND G.1.4 - IDENTIFICATION





## C.10 SAILS

### C.10.1 MODIFICATION, MAINTENANCE AND REPAIR

- (a) Routine repairs and maintenance are permitted without re-measurement and re-**certification**.

### C.10.2 LIMITATIONS

See C.6.2.

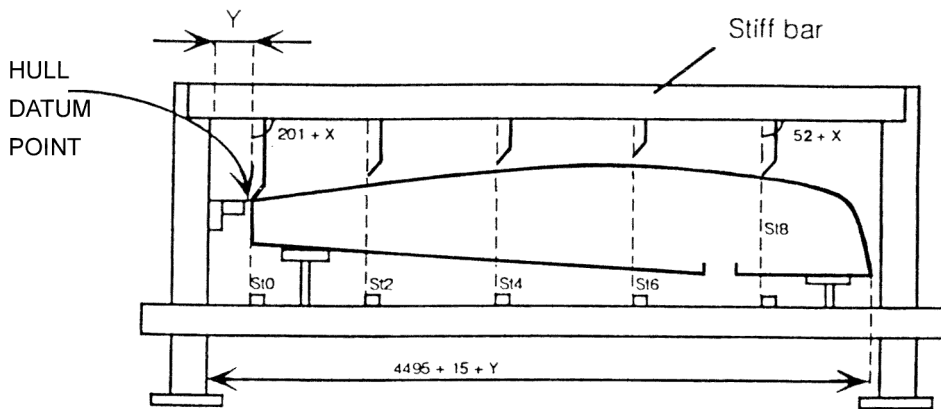
### C.10.3 IDENTIFICATION

- (a) The national letters and sail numbers shall comply with the RRS except where prescribed otherwise in these **class rules**. National letters and sail numbers shall be made from additional material of contrasting colour, firmly attached to the sail. National letters and sail numbers shall not be painted on.
- (b) As an exception to G.1.4 (a), for winners of the Finn Gold Cup and for Olympic Gold Medallists in the Finn Class, the sail insignia waves may be coloured Gold.
- (c) At World Sailing Sailing World Cup and World Sailing Sailing World Championship, or when required by the Notice of Race, a **skipper's** national flag, corresponding to the national letters, of nominal size 740 x 443 mm, shall be applied to each side of the sail, positioned such that the aft edge of each flag is between 50 and 100 mm from the **leech** and the upper edge is between 50 and 100 mm below the second lower **batten pocket**. The flags shall be made from additional material. Permanent ink pens or similar shall not be used to make the national flags.

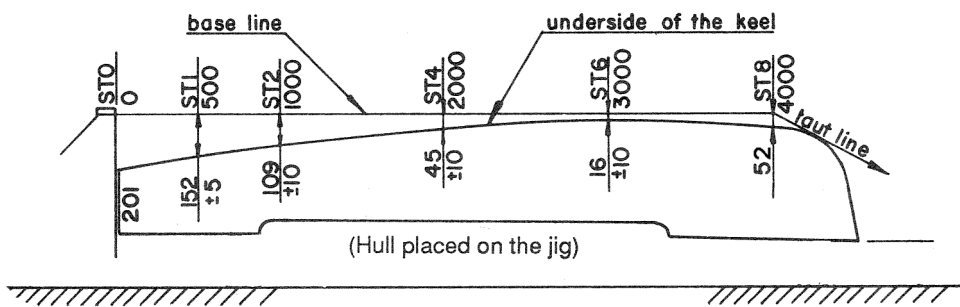
### C.10.4 USE

- (a) The **sail** shall be hoisted on a halyard. The arrangement shall permit hoisting and lowering of the **sail** at sea.
- (b) **Luff** and **foot** boltropes shall be in the **spar** grooves or tracks.
- (c) The highest visible point of the **sail**, projected at 90° to the mast **spar**, shall not be set above the mast **upper point**.
- (d) The aftmost visible part of the **sail**, projected at 90° to the boom **spar**, shall not be set outboard of the boom **outer point**.



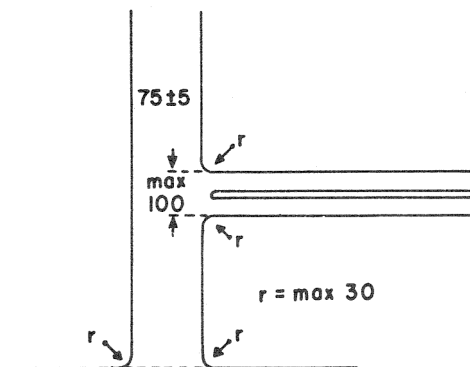


Section D - Principles of hull measurement when using a jig



Section D - Keel Profile

D.3.2 and D.9.1 - Radius at concave corners; thwart and centreboard case dimensions.





## Section D – Hull

### D.1 PARTS

#### D.1.1 MANDATORY

- (a) Hull shell
- (b) Deck
- (c) Thwart
- (d) Buoyancy units
- (e) Gunwale rubbing strakes
- (f) Floorboards or double bottom
- (g) Keel bands

#### D.1.2 OPTIONAL

- (a) Bulkheads

### D.2 GENERAL

#### D.2.1 CERTIFICATION

- (a) The **hull** and **centreboard** shall be measured together, and details shall be recorded as specified by Rule A.10. If a new **centreboard** is fitted, then **certification control** is required under Rule D.9, and measurement under E.2.5 (b).
- (b) World Sailing or an MNA may appoint one or more **In-House Official Measurers** to measure and **certify hulls** and **hull appendages** produced by that manufacturer.

#### D.2.2 DEFINITIONS

- (a) The three major axes of the boat at 90° to each other – vertical, longitudinal and transverse, shall be related to the baseline and the **hull** centreplane. The terms “above” and “below” assume that the hull is upright.
- (b) Hull Datum Point  
The intersection, on the centreplane of the **hull**, between the underside of the shell (excluding keelband if fitted) and the transom.
- (c) Baseline  
The measurement baseline shall be on the centreplane of the hull at the following vertical distances:
  - (1) 201 mm below the hull datum point.
  - (2) at Station 8 : 52 mm below the keelband.
- (d) Stations  
With the baseline horizontal, the Measurement Stations are the vertical planes normal to the baseline, with Station 0 at the hull datum point, Station 1 at 500 mm forward of the hull datum point, Station 2 at 1000 mm forward of the hull datum point, and so on.
- (e) **Hull length** is the distance parallel to the baseline from the plane of station 0 to the outside of the stemband, excluding any gunwale rubbing strake.



- (f) The Stem Template Datum Point is at the underneath of the keelband/stemband, at a position forward or aft of Station 8 by the amount that the hull length is greater or less than 4495mm.

#### D.2.3 BUILDERS

- (a) The Finn may be built by any professional or amateur builder
- (b) Professional builders shall be responsible for supplying boats or kits complying with the Finn Class Rules. The builder shall, at his own expense, correct or replace any boat that fails to pass **certification control**, due to omission or error by the builder, provided that the boat is submitted for **certification control** within 12 months of purchase.
- (c) From the 1<sup>st</sup> March 2013, builders of GRP hulls builders shall have the first hull inspected by a technical committee nominee whenever they bring into service new moulds for the hull, decks or inner hull.

#### D.2.4 IDENTIFICATION

- (a) The ISAF/World Sailing plaque prescribed by Rule A.8 shall be permanently placed in a visible spot on the **centreboard** case or on the aft bulkhead of the cockpit.
- (b) The ISAF/World Sailing plaque number or the number required by government legislation shall be moulded, engraved or carved into the **hull** shell. It should be on the starboard side of the aft trailing edge of the transom, but may be elsewhere if this is necessary to comply with such legislation.

### D.3 HULL

#### D.3.1 MATERIALS

The **hull** shall be made from wood or glass reinforced plastic, except that

- (i) core materials may be of foam or other material not containing carbon fibre.
- (ii) Rules D.6.1 and D.8.1 apply.
- (iii) Stern drain tubes may be of any material not containing carbon fibre.
- (iv) Except for D.3.1 (iii), this rule does not apply to **hull** fittings and **corrector weights**.

#### D.3.2 CONSTRUCTION

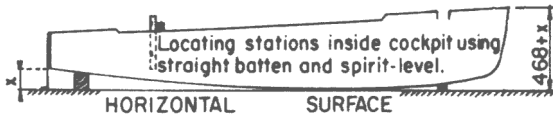
- (a) The concave corners where hull panels, deck, thwart, centreboard case and bulkheads meet may be rounded to a radius of not more than 30 mm.
- (b) If the centreboard pivot pin is movable, it must not allow Rule E.2.5 (b) to be contravened. It must not be moved during a race. For **certification control** under Rules D.9.2 and D.9.3, the centreboard pivot pin must be in its aftmost position.
- (c) The pivot pin shall pass through the walls of the centreboard case.
- (d) Longitudinal tapering and rocking points on the centreboard box are prohibited.
- (e) Centreboard box sealing strips are prohibited.



- (f) From Station 0 to Station 6, hollows in the hull form are prohibited. From Station 6 to the Stem, hollows in the plane of the Sections are prohibited. Minor distortion due to curing of plastic hulls is acceptable.
- (g) Except at the sides of the keelband position, knuckles and chines are prohibited.

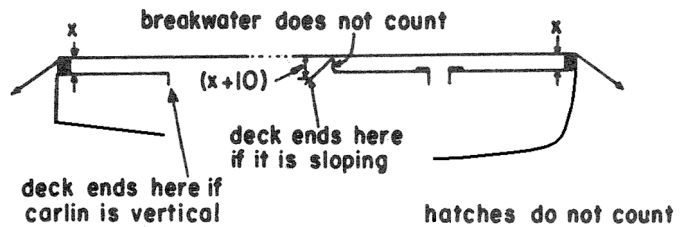


### D.4 - Setting up the hull for cockpit measurement



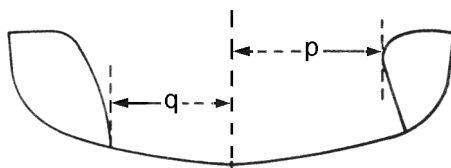
### D.4 - Deviation of the top of the deck at centreplane from a straight line between the stemhead and St.0.

Limit of variation from a taut line is  $(x \pm 10\text{mm})$ .



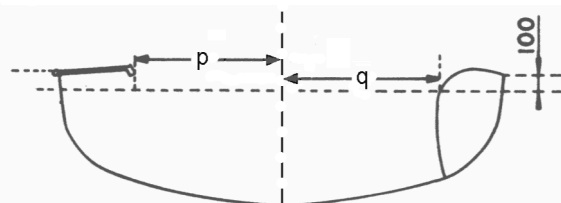
### D.4 - Cockpit minimum width

p and q are examples showing the distance from centreplane to side decks or built in tanks.



### D.4 - COCKPIT MAXIMUM WIDTH

Distance from centreplane to side decks or built in tanks at some point between the sheer and 100 mm below the sheer





## D.4 DECK

### D.4.1 CONSTRUCTION

- (a) The shapes of the decking and built in tanks (if fitted) shall be approximately the same on both sides of the boat.
- (b) The general arrangement of the decking and cockpit shall be substantially as shown in the plans except as varied by these rules.
- (c) The ends of the cockpit may be either straight across the boat or faired into the side decks.
- (d) Pads and recesses to mount or locate fittings are permitted, but not at the **sheerline**.

## D.5 BUOYANCY

### D.5.1 DEFINITION

- (a) Buoyancy units are bags, tanks or foam blocks enabling compliance with D.5.2, D.5.3 and C.6.1.
- (b) A tank having holes for running rigging or for the mast is not a buoyancy unit.
- (c) Other buoyancy may be fitted, providing that no other rule is infringed.

### D.5.2 CONSTRUCTION

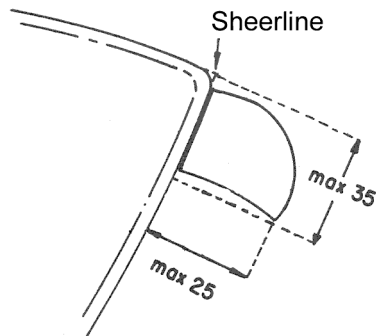
- (a) At least 4 separate buoyancy units shall be fitted, so that the flooded **boat** can satisfy the buoyancy requirements of D.9.1.
- (b) Every buoyancy tank shall be fitted with an inspection hatch.
- (c) Buoyancy tanks may be fitted with drain holes. If so, they shall be capable of being securely plugged.
- (d) There shall be no surplus buoyancy within the cockpit area above the floorboards, except that flexible bags may bulge within this area as long as their main volume and their anchorages for the fixation straps are outside it.

### D.5.3 INSPECTION AND TESTING

- (a) The measurer shall satisfy himself that the buoyancy units and arrangement are effective to ensure compliance with D.5.2 (a) and (b), also with C.6.1.
- (b) In deciding whether a buoyancy test is required under this Rule or under Rule C.6.1, a measurer may take account of certified compliance with the pressure drop tests prescribed in ISO 12217-3:2002 Annex C.



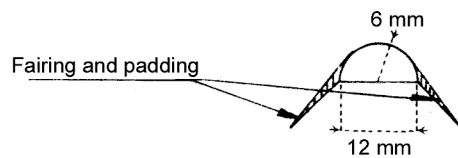
## D.6 - Gunwale rubbing strakes



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## D.8 - Keel bands and stem band.

D.8.1 (c) and (d): Fairing and padding are not allowed for the keel bands, but are allowed for the stem band forward of Station 8. The stem band radius must not be less than 6 mm.





## **D.6 GUNWALE RUBBING STRAKES**

### **D.6.1 MATERIALS**

The gunwale rubbing strakes may be formed as part of the hull. If made separately, they may be made from any resilient Material.

### **D.6.2 CONSTRUCTION**

- (a) Gunwale rubbing strake dimension minima are not applicable within 100 mm of the stem and 100 mm of station 0.
- (b) Gunwale rubbing strakes may be rounded on the outside and hollowed on the underside.
- (c) Gunwale rubbing strakes must be capable of supporting the boat for the pendulum test.

## **D.7 FLOORBOARDS OR DOUBLE BOTTOM**

### **D.7.1 CONSTRUCTION**

- (a) The floorboards shall extend at least from station 4 to the aft end of the cockpit. They shall lie in a straight line athwartships and have sufficient support to enable them to remain substantially flat when under load.
- (b) The floorboards may be pierced with holes totalling not more than 10% of their nominal area.
- (c) The floorboards may be part of the hull to form a double bottom.

### **D.7.2 OPTIONAL**

Forward of Station 4, floorboards if fitted need not comply with D.7.1 (a) and (b).

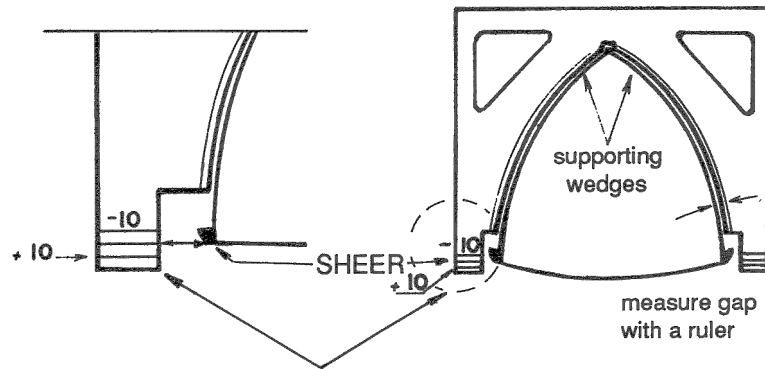
## **D.8 KEEL BANDS AND STEM BAND**

### **D.8.1 MATERIALS**

Between Stations 0 and 8, bands where fitted may be made from any resilient material.

### **D.8.2 CONSTRUCTION**

- (a) The keel bands are optional from Station 0 to the forward end of the moulded Centreboard Slot
- (b) Forward of the moulded Centreboard Slot the stem band and keel band are compulsory
- (c) Between Station 0 and 8 Bands where fitted shall be made separately from the **hull**.
- (d) Between Station 8 and the top of the stem, the stem band may be part of the **hull**, and may be faired into the **hull**.
- (e) The forward keel band may be tapered vertically for up to 25mm from the forward end of the centreboard slot.

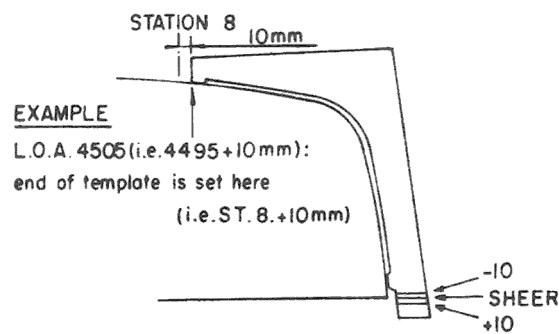


### Section D.9.1 - Hull shape measured with templates

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### Rule D.9.1 - Checking stem profile with the template

The example shows how to set up the stem template on a boat of maximum length. The template tabs shall touch the stem band; the sheer shall lie within the tolerance; and the gap between stem band and template shall not be more than 10 mm.





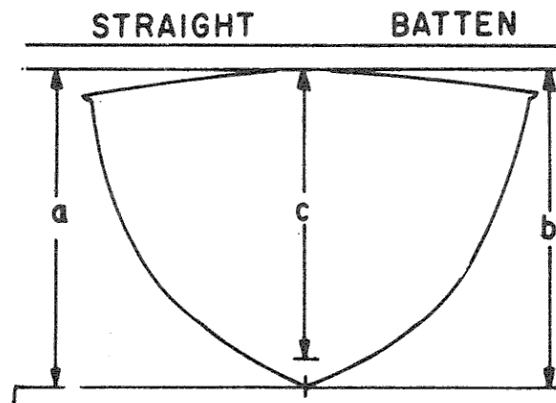
## D.9 ASSEMBLED HULL

### D.9.1 DIMENSIONS

	minimum	maximum
<b>Hull length</b> .....	4480 mm	4510 mm
Transom forward of Station 0: .....	0 mm	5 mm
<b>Baseline below hull shell:</b>		
at station 1 .....	147 mm	157 mm
at station 2 .....	99 mm	119 mm
at station 4 .....	35 mm	55 mm
at station 6 .....	6 mm	26 mm
Stem profile (outside stem band) to template: .....	0 mm	10 mm
<b>Sheer</b> above position marked on stem template: .....	-10 mm	+10 mm
Keel Band Section radius (half round) .....	6 mm	
Stem Band (forward of Section 8) radius .....	6 mm	
<b>Centreboard Case;</b>		
slot width .....	8 mm	12 mm
overall width .....	100 mm	
centre of centreboard pivot pin above underside of keel	40 mm	50 mm
Fore and aft adjustment for centreboard pivot pin .....	20 mm	
<b>Hull shell to hull template:</b>		
at station 0, 2, 4, 6 and 8 .....	0 mm	10 mm
<b>Sheerline</b> above position marked on template:		
	(Port)	(Starboard)
	minimum	maximum
at station 0, 2, 4, 6 and 8 ...	-10 mm	10 mm
at station 0, 2, 4, 6 and 8 ...	-10 mm	+10 mm
Length of foredeck .....	1350 mm	1450 mm
Length of aft deck .....	550 mm	650 mm
<b>Distance between side decks or built in tanks and the centreplane:</b>		
	minimum	maximum
at station 2 .....	410 mm	
at station 3 .....	500 mm	
at station 4 .....	490 mm	
at station 5 .....	440 mm	
<b>Distance between side decks or built in tanks and the centreplane, at some point between the sheerline and 100mm below the sheerline:</b>		
	minimum	maximum
at station 2 .....	520 mm	
at station 3 .....	560 mm	
at station 4 .....	550 mm	
at station 5 .....	500 mm	

### D.9.1 - Height of mast step above underside of keel band

$$\left(\frac{a+b}{2}\right) - c \text{ is maximum } 56 \text{ mm}$$





Minimum maximum

Top of the deck at centreplane above the <b>sheer</b> at station 0.....	45mm	....	55 mm
Top of the deck at centreplane above a straight line between the stemhead and station 0 (excluding breakwaters, hatches, cockpit coamings and mast deck bearing arrangements).....	-10 mm	....	10 mm
Buoyancy: Support provided by flooded boat; with buoyancy units intact .....	120 kg		
with any one buoyancy unit flooded .....	90 kg		
Inside diameter of buoyancy tank inspection holes .....	95 mm		
Gunwale rubbing strakes; depth (down from the <b>sheerline</b> around the <b>hull</b> ).....	20 mm	....	35 mm
width (at a right angle to the shell) .....	20 mm	....	25 mm
Width of floorboards; at station 2 .....	800 mm		
at station 3 .....	880 mm		
at station 4 .....	720 mm		
Floorboards or double bottom below <b>sheer</b> ; At station 2 .....	285 mm		
At station 3 .....	325 mm		
At station 4 .....	375 mm		
At station 5 (If fitted) .....	375 mm		
At station 6 (If fitted) .....	390 mm		
Thwart; depth .....	16 mm	..	50 mm
width .....	70 mm	..	80 mm
aft side forward of station 0 .....	1950 mm		2050 mm
top of thwart below <b>sheer</b> .....		..	130 mm
Mainsheet traveller block (centreline of attachment); Travel from centreplane of boat .....		..	550 mm
Travel forward of station 4.....		..	150 mm
Height of mast heel above underside of Keel Band .....		..	56 mm
Height of mast bearing surface above deck .....		..	10 mm
Horizontal play in bearings .....		..	5 mm
Number of holes in the transom .....		..	4
Diameter of 2 largest transom holes.....		..	150 mm
Diameter of 2 other holes .....		..	30 mm
Bearing at Transom Pintle above <b>hull datum point</b> .....	52 mm	....	57 mm
Bearing at Transom Gudgeon above <b>hull datum point</b> .....	262 mm	..	267 mm
Axis of Transom Pintle aft of Station 0 ( $\alpha$ ).....	10 mm	....	30 mm
Axis of Transom Gudgeon aft of Station 0 ( $\beta$ ) .....	10 mm	....	30 mm
Difference between ( $\alpha$ ) and ( $\beta$ ).....		....	2 mm
Diameter of Pintle and of Gudgeon Hole.....	7.9 mm	..	8.1 mm





## D.9.2 WEIGHT

### (a) Condition for weighing

For the purpose of Rules D.9.2, D.9.3 and D.9.4, the weighing condition for the assembled **hull** with **centreboard** installed is as follows:

- (1) If the Centreboard Pin, Mast Step and Deck bearing are movable, they shall be in their maximum aft positions.

The weight shall be taken

- (2) including **centreboard**, hiking pads, compass mountings and magnetic compasses having no electronics, other fittings, securely fastened containers, and normal ropes, but
- (3) excluding timer, electronic compass, rudder assembly, mainsheet and painter.
- (4) The **hull**, fittings and ropes shall be in a dry condition.
- (5) Control lines shall be pulled tight and wrapped around the thwart.
- (6) The **centreboard** shall be raised so that its lower corner is level with the underneath of the hull (keel bands excluded).

<b>(b) Weight</b>	minimum	maximum
The weight of the <b>hull</b> and <b>centreboard</b> in dry condition ..	116.0 kg	

## D.9.3 HULL WEIGHT DISTRIBUTION AND CENTRE OF GRAVITY

- (a) See Appendix H.3 for details of the Hull Weight Distribution and Centre of Gravity Measurement.

- (b) The following measurements shall be taken;

- (i) Distance  $\lambda$  from the centre of gravity to Station 0.
- (ii) Distance  $d$  of axis  $O_1$  to the underneath of the keel (keel bands excluded).
- (iii) Periods of oscillations:  $T_1$  around axis  $O_1$ .  $T_2$  around axis  $O_2$ .

<b>(c) Dimensions</b>	minimum	maximum
Distance $\lambda$ .....	2100 mm	2290 mm
Distance $h$ from underneath the hull (keel bands excluded) to the centre of gravity (see H.3) .....	210 mm	
Radius of gyration $\rho$ .....	1100 mm	

## D.9.4 CORRECTOR WEIGHTS

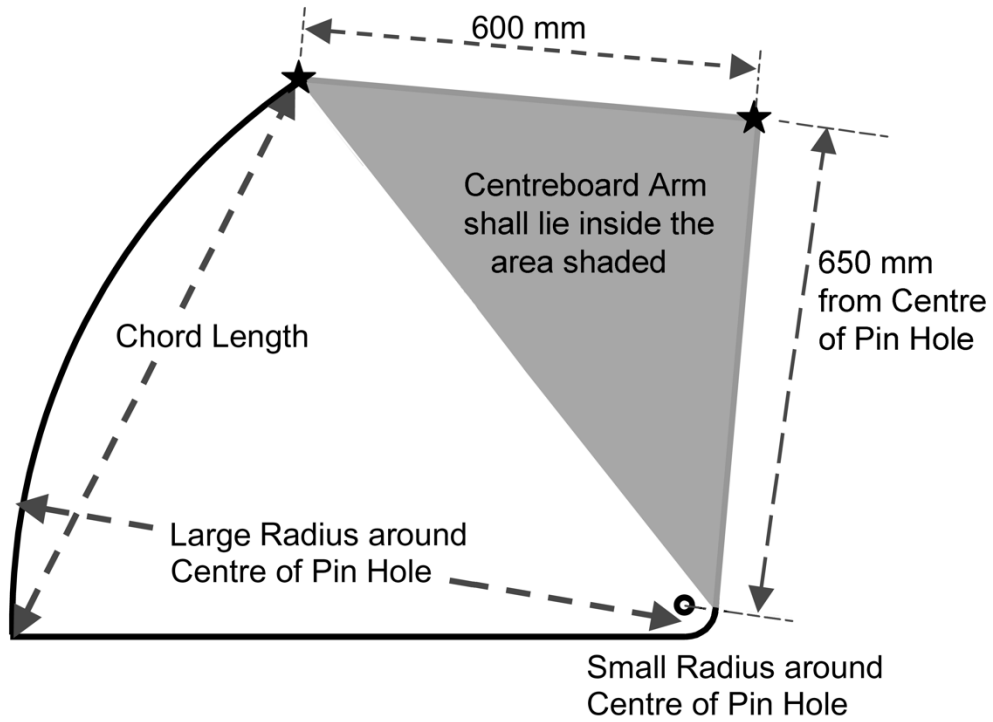
- (a) Lead **Corrector weights** shall be securely fastened to the **hull** if necessary to ensure compliance with D.9.2 and D.9.3. **Corrector weights** shall be visible to allow for inspection without the use of tools.
- (b) The total weight of such **corrector weights** shall not exceed 5 kg. The number, position and size of the hull **corrector weights**, and notes of other fittings (such as compasses and hiking pads) having a significant effect upon compliance with D.9.2 and D.9.3, shall be recorded as prescribed by Rule A.10.
- (c) Hull **corrector weights** shall be shaped as blocks of standard sizes multiples of 0.25kg or 1.0kg.



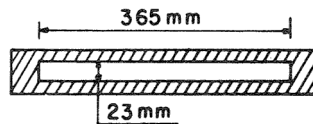
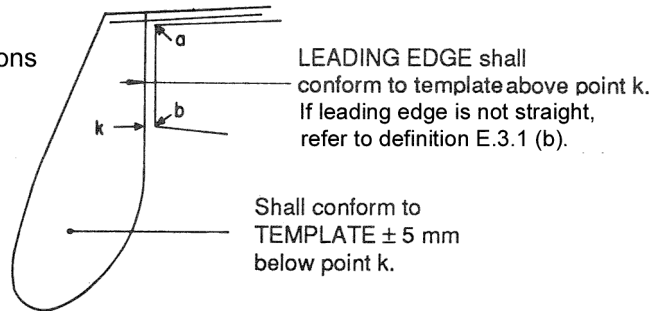
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**E.2.5 (a). CENTREBOARD DIMENSIONS**



**E.3.4 -  
 Rudder Dimensions**



RUDDER GAUGE for thickness cut in 6 mm aluminium plate



## Section E – Centreboard and Rudder

### E.1 GENERAL

#### E.1.1 CERTIFICATION

World Sailing or an MNA may appoint one or more **In-House Official Measurers** to measure and **certify hull appendages** produced by that manufacturer.

#### E.1.2 MANUFACTURERS

**Rule D.2.3 applies to hull appendages.**

### E.2 CENTREBOARD

#### E.2.1 DEFINITION

The Centreboard theoretical reference point is where the straight line extension of the leading edge meets the largest radius measured.

#### E.2.2 CERTIFICATION AND IDENTIFICATION.

- (a) Each **centreboard** shall have its own identifying number, which may be the same as the ISAF/World Sailing plaque for the **hull**. It shall be engraved, etched or stamped on the centreboard arm, visible in the raised position.
- (b) An IFA approved **official measurer** shall **certify centreboards** by fixing, signing and dating a **certification mark** on the centreboard arm, visible in the raised position.
- (c) The **certification mark** shall be a durable sticker produced under the authority of the IFA, or an IFA approved **official measurer's** personal mark.

#### E.2.3 MATERIALS

- (d) The **centreboard** shall be of aluminium alloy of 8 mm nominal thickness, except that the leading and trailing edges may be shaped.
- (e) The **centreboard** may be anodised or coated with a clear coating.
- (f) Fibre and opaque reinforcement are permitted only to repair corrosion and other damage.

#### E.2.4 FITTINGS

##### (a) **Mandatory**

- (1) A stop to prevent the **centreboard** from contravening rule E.2.5 (b).
- (2) The **centreboard** shall have a hole to accept the centreboard pivot pin.



## E.2.5 DIMENSIONS

### (a) Centreboard

The Centreboard Arm shall fit within the area shown in the diagram.

	minimum	maximum
Large Radius .....	885 mm	895 mm
Small Radius .....	30 mm	40 mm
Chord Length .....	815 mm	825 mm
Thickness .....	8 mm	8 mm
Edge shaping distance .....		25 mm

### (b) Centreboard fitted in hull

Hole diameter larger than pivot pin diameter.....	0 mm	2 mm
Centreboard theoretical reference point below <b>hull</b> shell (excluding keelbands) .....		700 mm
Distance from <b>hull datum point</b> to aft edge of partially or fully extended <b>centreboard</b> , measured along the <b>hull</b> shell .....	2050 mm	
Projection below <b>hull</b> shell when fully raised.....		0 mm

## E.2.6 WEIGHT

	minimum	maximum
.....	11 kg	13 kg

## E.3 RUDDER ASSEMBLY

### E.3.1 DEFINITIONS

- Point “k” is the leading edge at the waterline position taken from the **rudder** template.
- The leading edge above point “k” is a line passing through point “k”, running parallel to the main axis of the **rudder** gudgeon and pintle upwards to deck level.

### E.3.2 CERTIFICATION

- Each **rudder** shall have its own identifying number. It shall be moulded, engraved, etched or stamped on the side of the rudder stock.
- An IFA approved **official measurer** shall **certify** rudders by fixing, signing and dating a **certification mark** on the side of the rudder stock.
- The **certification mark** shall be a durable numbered sticker produced under the authority of the IFA, or an IFA approved **official measurer’s** personal mark.

### E.3.3 MATERIALS

- Materials for rudder construction are free.



### E.3.4 DIMENSIONS

	minimum	maximum
Distance from leading edge to the rudder template Above point k .....	0 mm	0 mm
Distance from the edge to the rudder template Below point k .....	-5 mm	5 mm
Thickness of Rudder blade below point k.....		23 mm
Bearing at Rudder Gudgeon above point k .....	52 mm	57 mm
Bearing at Rudder Pintle above point k .....	262 mm	267 mm
Point k aft from Axis of Rudder Gudgeon and Pintle .....	10 mm	15 mm
Diameter of Gudgeon Hole and of Pintle.....	7.9 mm	8.1 mm

### E.3.5 WEIGHTS

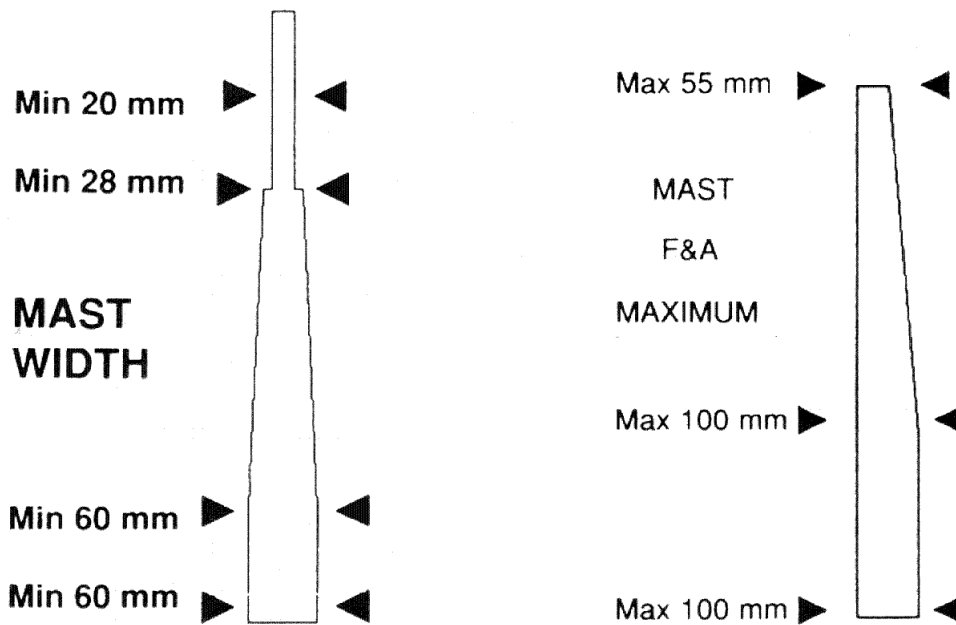
	minimum	maximum
(a) Overall weight of <b>rudder</b> , tiller, extension and fittings.....		4 kg
(b) Lead Corrector weights shall be securely fastened external to the rudder if necessary to ensure compliance with E.3.5 (a).		
(d) The total weight of such <b>corrector weights</b> .....		1 kg



## F.2.6 - Mast cross-section dimensions

Mast fore-and-aft shall not exceed the dimensions from the formula

Mast width shall not be less than the dimensions from the formula





## Section F – Rig

### F.1 GENERAL

#### F.1.1 CERTIFICATION

World Sailing or an MNA may appoint one or more **In-House Official Measurers** to measure and certify **spars** produced by that manufacturer.

#### F.1.2 MANUFACTURERS

Rule D.2.3 applies to **spars**.

### F.2 MAST

#### F.2.1 DEFINITIONS

(a) **Mast Spar.**

As defined in ERS. An attached or glued on sail track is part of the **spar**.

(b) **Main central axis.**

The **main central axis** of the **spar** shall be taken as a straight line passing through the following points;

- (i) Centre of the heel bearing
- (ii) Point 20 mm forward of the aft edge at the **upper point**

(c) **(Mast) heel (point)** is the lowest point of the mast.

(d) **Aft edge line.**

The aft edge of the mast between the upper point and the point where the sail leaves the mast, and its extensions. Fittings or built-in fairleads where the sail leaves the mast shall be disregarded. Any **mast spar curvature** shall be removed when taking measurements depending on the aft edge line.

#### F.2.2 CERTIFICATION AND IDENTIFICATION

- (a) **Masts** shall be measured by an IFA approved **official measurer** before leaving the **mast** builder's premises.
- (b) Each **mast** shall have its own identifying number. It shall be moulded, engraved, etched or stamped within 1 metre above the deck bearing.
- (c) Each **mast** shall have a numbered IFA Mast Label attached within 1 metre above the deck bearing.
- (d) Each **mast** shall have a Mast Measurement Card, complying with the requirements of Appendix H.1.3.
- (e) The IFA approved **official measurer** shall sign and date the IFA Mast Label, and shall **certify masts** by completing the Mast Measurement Card.





### F.2.3 MATERIALS

- (a) The **spar** shall be made of wood, fibre reinforced plastic, aluminium alloy or a combination of these materials.
- (b) Anodising and protective coatings are allowed.
- (c) Plastic extruded sail track is allowed.
- (d) Fastenings may be of any material.

### F.2.4 CONSTRUCTION

- (a) Holes shall be provided so that water drains readily from near the heel of the **spar**.
- (b) Flexible fairings are prohibited

### F.2.5 FITTINGS

#### (a) **Mandatory**

- (1) Rigidly attached or integral mast bearing surfaces.
- (2) A fork fitting shall be rigidly attached to the mast, to accept the boom.
- (3) The whole top of the spar above the **upper point** shall be painted a distinctive colour.
- (4) **Corrector weights**, if fitted, shall be made of lead, and securely fastened to the outside of the mast above deck level.

#### (b) **Optional**

- (1) Mechanical wind indicators.
- (2) Cleats, fairleads, lead blocks, halyard lock, halyard crane and other arrangements for halyard and control lines.

### F.2.6 DIMENSIONS

- (a) The **mast spar** fore-and-aft cross-section, including sail track but not deck ring nor other fittings shall not exceed
  - (1) From **heel** to 2060 mm above the **heel**: 100 mm; thence
  - (2) A uniform taper to 55 mm at 6560 mm above the **heel**.

*Example fore-and-aft dimensions;*

<u>Distance from heel</u> .....	<u>maximum</u>
2060 mm .....	100 mm
2560 mm .....	95 mm
3560 mm .....	85 mm
4560 mm .....	75 mm
5560 mm .....	65 mm
6560 mm .....	55 mm



- (b) The **mast spar** transverse cross-section shall be not less than
- (1) From below the **heel bearing** to 1000 mm above the **heel**: 60 mm;
  - (2) From (**heel +1000 mm**) a uniform taper from 60 mm to 28 mm at (**heel + 5000 mm**)
  - (3) From (**heel + 5000 mm**) to (**heel + 6573 mm**): 20 mm

*Example transverse dimensions;*

<u>Distance from heel</u> .....	<u>minimum</u>	<u>maximum</u>
10 mm .....	60 mm	
1000 mm .....	60 mm	
2000 mm .....	52 mm	
3000 mm .....	44 mm	
4000 mm .....	36 mm	
5000 mm .....	28 mm	

- (c) Distance from **main central axis** to outer surface of **mast** or mast bearings (excluding other fittings)..... 60 mm

(d) Other Dimensions:

<b>Upper point</b> height.....	6560 mm
Depth of extruded sail track (if fitted).....	20 mm
Diameter of <b>mast</b> heel bearing.....	62 mm .... 64 mm
Diameter of <b>mast</b> deck bearing.....	102 mm .. 104 mm
Width between arms of the boom fork fitting .....	37 mm .... 40 mm
Centre of boom pin holes in fork fitting above heel .....	820 mm
Centre of boom pin holes aft of the aft edge line .....	40 mm
Diameter of boom pin holes.....	15.5 mm . 16.5 mm
<b>Mast spar curvature</b> between the upper point and the point where the sail leaves the mast .....	10 mm

## F.2.7 WEIGHTS

	minimum	maximum
<b>Mast weight</b> .....	8 kg	
<b>Corrector weights</b> .....		1 kg
<b>Mast</b> centre of gravity above heel, including halyard and shackle, with halyard hoisted and tail of halyard wound around mast below boom fork, with corrector weights but excluding boom pin.....	2400 mm	

## F.3 BOOM

### F.3.1 CERTIFICATION AND IDENTIFICATION

- (a) Each **boom** shall have its own identifying number. It shall be moulded, engraved, etched or stamped on a side of the **boom** within 1 metre of the forward end.
- (b) An IFA approved **official measurer** shall **certify booms** by fixing, signing and dating a **certification mark** on a side of the **boom** within 1 metre of the forward end.



(c) The **certification mark** shall be a durable numbered sticker, or an **official measurer's** personal mark.

F.3.2 MATERIALS

- (a) The **spar** shall be of wood; glass reinforced plastic, aluminium alloy or a combination of these materials.
- (a) Anodising and protective coatings are allowed.

F.3.3 CONSTRUCTION

The **boom spar** shall include a sail groove.

F.3.4 FITTINGS

(a) **Mandatory**

- (1) There shall be a hole, reinforced if necessary, to accept the boom pin.
- (2) There shall be a boom pin to attach the boom to the mast.
- (3) A **boom outer limit mark** which shall be distinctively coloured and painted on.
- (4) **Corrector weights**, if fitted, shall be made of lead, and securely fastened to the outside of the boom within 1000 mm of the centre of the boom pin hole.

(b) **Optional**

- (1) Arrangements for attaching the mainsheet.
- (2) Arrangements for sail control lines and boom vang.
- (3) A fairlead where the sail leaves the **spar**.
- (4) A chafing pad beneath the outboard end of the **spar**.
- (5) Pads to protect the helmsman.

F.3.5 DIMENSIONS

minimum maximum

**Boom spar** cross section between 460mm and 3243 mm aft of the centre of the boom pin hole;

<b>vertical</b> .....	77 mm	..	82 mm
<b>transverse</b> .....	32 mm	..	37 mm
Boom Spar Curvature .....			5 mm
Centre of boom pin hole below upper edge of boom.....	40 mm		
Diameter of boom pin hole .....	15.5 mm	.	16.5 mm
<b>Outer Point</b> from centre of the boom pin hole .....			3230 mm
<b>Limit mark</b> width .....	13 mm		
Length of <b>sail</b> groove.....	2700 mm		

F.3.6 WEIGHTS

minimum maximum

Boom weight, including mast pin, blocks, boom vang outhaul and other fittings normally removed with the <b>boom</b> , but excluding mainsheet. ....	5 kg
<b>Corrector weights</b> .....	0.5 kg



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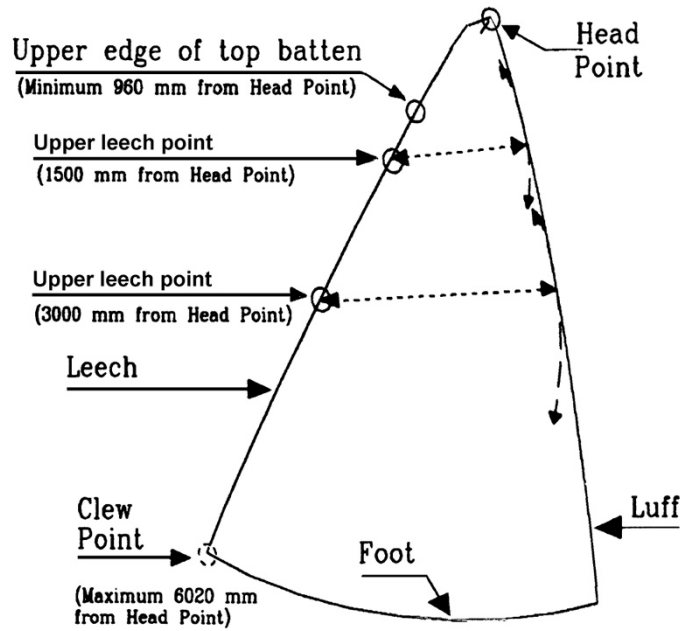


## G.1.4 (b) - SAIL INSIGNIA



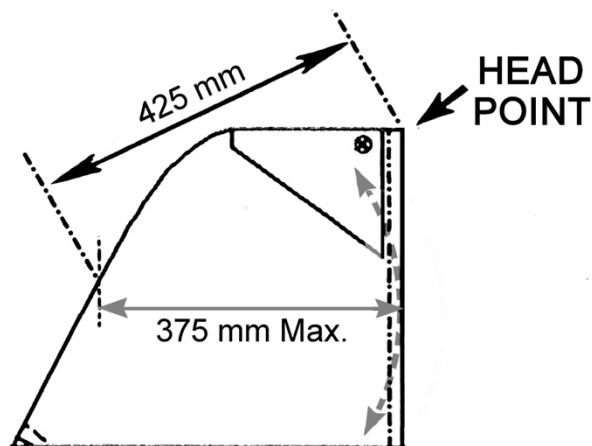
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## G.1.7 – SAIL MEASUREMENT



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### G.1.7 - Upper width at upper leech point 425 mm from the head point





## Section G – Sail

### G.1 GENERAL

#### G.1.1 RULES

**Sails** shall comply with current **class rules**.

#### G.1.2 CERTIFICATION

- (a) World Sailing or an MNA may appoint one or more **In-House Official Measurers** to measure and **certify sails** produced by that manufacturer.
- (b) **Sails** shall be measured by an **official measurer** before leaving the sail loft.
- (c) Every **sail** shall have a new sail label **certification mark** purchased by the sailmaker from IFA and permanently attached near the **tack**.
- (d) The **official measurer** shall **certify sails** by signing and dating the **sail** across the **certification mark**.

#### G.1.3 SAILMAKER

Rule D.2.3 applies to **sails**.

#### G.1.4 IDENTIFICATION

- (a) The class sail insignia shall be two blue waves approximately 700 mm long. From left to right they shall go up, then down and up again. They shall be placed in accordance with Appendix G of the RRS.
- (b) The class insignia shall be made from additional material of contrasting colour, firmly attached to the sail. Painted class insignia are prohibited.

#### G.1.5 MATERIALS

- (a) The sail shall be made of flexible materials, which may be laminated.
- (b) Battens may be of any material.

#### G.1.6 CONSTRUCTION

- (a) The construction shall be: **soft sail, single ply sail**, with luff rope and foot rope.
- (b) Continuous layers or fibres crossing the seams are prohibited
- (c) The **sail** may have five **batten pockets** in the **leech**.
- (d) The following are permitted: **Seams**, stitching, glues, tapes, **tabling**, **primary reinforcement**, **secondary reinforcement**, corner eyes, headboard with fixings, Cunningham eye or block, flutter patches, battens, **batten pocket patches**, batten pocket elastic, batten pocket end caps, headboard slides extending not more than 200mm down from the **head point**, track slides, leech line with cleat, Velcro fastening, tell tales, sail shape indicator stripes, sail identification, sailmaker labels.

#### G.1.7 DIMENSIONS

In alteration to ERS H.5.1, **sails** may be measured with the battens in position.



	minimum	maximum
<b>Leech length</b> .....		6020 mm
Distance from <b>Head Point</b> to any part of the sail .....		6050 mm
<b>Upper width at upper leech point</b> 3000 mm		
from the <b>head point</b> ** .....		1935 mm
<b>Upper width at upper leech point</b> 1500 mm		
from the <b>head point</b> ** .....		1075 mm
<b>Upper width at upper leech point</b> 425 mm		
from the <b>head point</b> ** .....		375 mm
** If there is a hollow at an <b>upper leech point</b> , this shall be added to the measured distance.		
<b>Top width</b> .....		165 mm
Width of <b>single ply</b> panels .....		1000 mm
Depth of headboard from <b>head point</b> .....		200 mm
Width of headboard .....		150 mm
Thickness of headboard .....		20 mm
<b>Clew Point to:</b>		
aft end of <b>foot</b> rope .....		150 mm
forward end of <b>foot</b> rope .....		2500 mm
Batten lengths:		
Uppermost batten:.....		400 mm
second batten:.....		600 mm
third batten: .....		700 mm
fourth batten: .....		600 mm
lowest batten: .....		500 mm
Batten width: .....		50 mm
<b>Batten pocket width, inside</b> .....		50 mm
<b>Head point</b> to intersection of <b>leech</b> and upper part of uppermost batten .....		960 mm
Distance from lower part of a batten at the <b>leech</b> to the upper part of the batten below at the <b>leech</b> or to the <b>clew point</b> .....		900 mm



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### H.1.3 SUITABLE FORMAT FOR MAST CARD

Supplier's Letterhead with any Logo, Address, Telephone, E-Mail etc.  
*Suppliers of International Finn Class Masts... etc. (not more than one line)*

**This is to Certify** that the Mast has been built in accordance with the current Rules of the International Finn Class, that the Mast Label has been correctly obtained from the International Finn Association, and that to the best of my knowledge and belief the mast has passed correct measurement from the authorized Measurer below.

**Signed** (Mast Manufacturer or Representative) .....

**Date** ..... **Date of Manufacture** .....

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INTERNATIONAL FINN CLASS **MAST** MEASUREMENT CARD

F.2.2 (a) Measurer ..... Measurer's Signature .....

Measurer authorized by ..... Date of Certification Control  
.....

F.2.2 (b) IFA Mast Label attached ..... Number  
.....

F.2.3 **Materials**.....

F.2.3 (c) Material of the sail track .....



## PART III – APPENDICES

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

### **Section H**

#### **APPENDIX H.1. CERTIFICATE, MEASUREMENT FORM, MAST CARD AND CERTIFICATION MARKS.**

##### H.1.1 MEASUREMENT FORM

The Measurement Form for the **hull** and **centreboard** shall be in the latest form approved found in the World Sailing website:

<http://sailing.org/classesandequipment/FINN.php>

##### H.1.2 MAST CARD

The Mast Card prescribed by rules A.10 and F.2.2 shall be in a form approved by IFA. A suitable format is shown. Manufacturers are invited to use the reverse side of the Mast Card to record the bend characteristics of the mast.

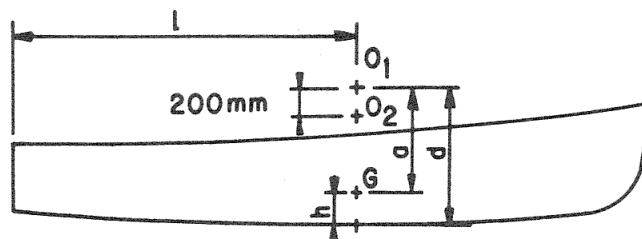


## APPENDIX H.2. DIAGRAMS.

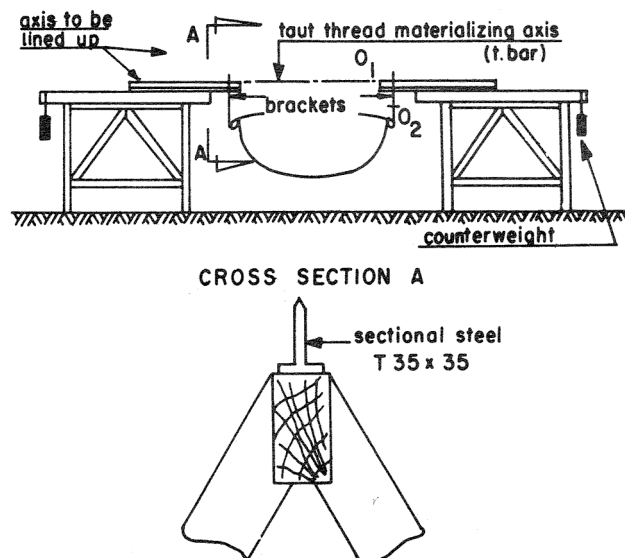
H.2.1 GENERAL DIAGRAMS RELATING TO MEASUREMENT EQUIPMENT  
(To be developed)

H.2.2 DIAGRAMS RELATING TO APPENDIX H.3 (LAMBOLEY SWING TEST)

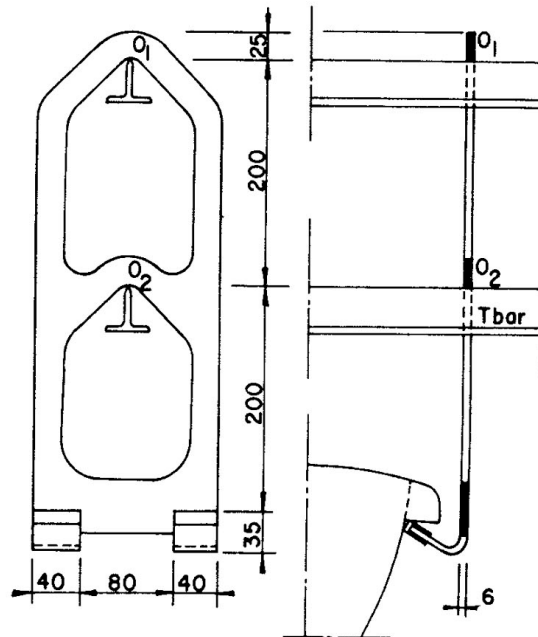
### Diagram 20 - WEIGHT DISTRIBUTION



### Diagram 21 - SETTING UP OF BOAT FOR OSCILLATION



## Diagram 22 - Brackets



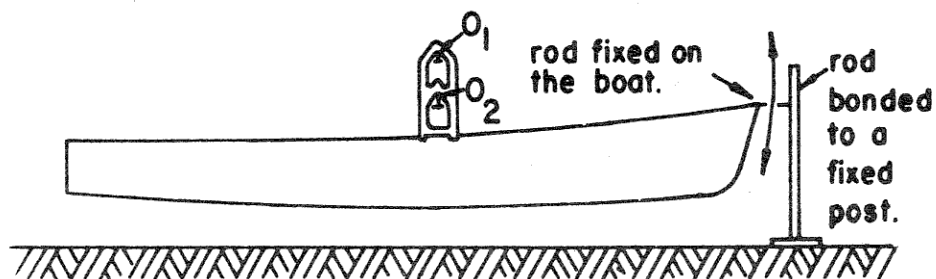
**Material: Mild Steel**

**Mass (2 hooks): 2.70 kg min, 3.30 kg max**

**Detailed drawings are available and  
should be used for construction.**

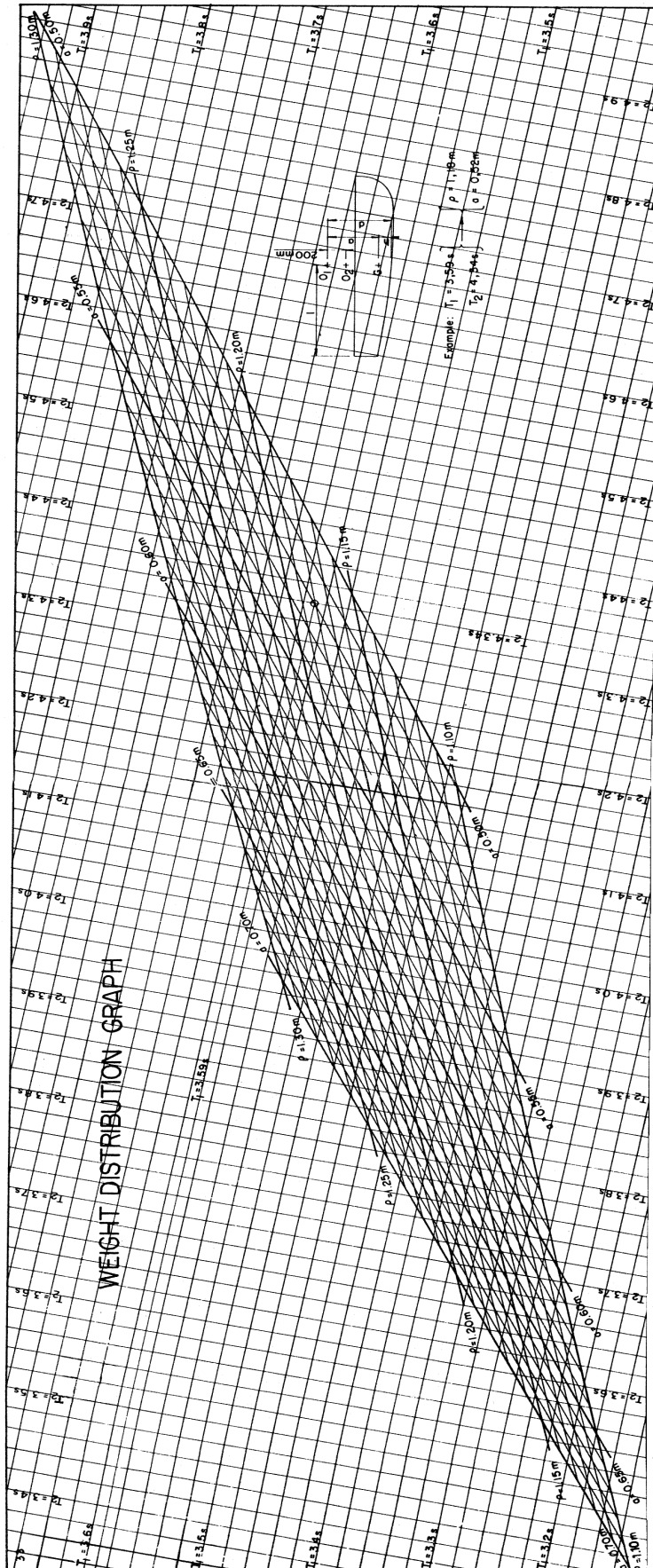
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## Diagram 23





**Diagram 24**





## APPENDIX H.3

### WEIGHT DISTRIBUTION AND CENTRE OF GRAVITY: PRINCIPLES

The degree of concentration of the weight in the boat is described by her radius of gyration. A boat with "light ends" has a short radius of gyration.

In Diagram 20, if "a" is the distance from the oscillation axis  $O_1$  to the centre of gravity G, "ρ" is the radius of gyration, and "g" is the acceleration due to gravity, then the oscillating period  $T_1$  is given by:

$$T_1 = 2\pi \sqrt{\frac{a^2 + \rho^2}{ag}}$$

We can measure T but we have two unknowns "a" and "ρ"; so we need two equations. Another is obtained by choosing a new oscillation axis  $O_2$  exactly 200 mm lower:

$$T_2 = 2\pi \sqrt{\frac{(a - 0.2m)^2 + \rho^2}{(a - 0.2m)g}}$$

Hence by measuring  $T_1$  and  $T_2$  we may calculate "a" and "ρ".

Solutions applicable to the Finn are presented in the graph (See Diagram 24).

The setting up of the axes  $O_1$  and  $O_2$  may be achieved with the equipment illustrated in diagrams 21 and 22. The brackets are designed to keep distance "a" short, to aid accuracy. The distance  $O_1 O_2$  shall be correct to within 1 mm. (See Diagram 20 to 24.)

### WEIGHT DISTRIBUTION AND CENTRE OF GRAVITY: PRACTICE

It is essential that the measurements be made in a sheltered place. The boat shall be hung from the brackets on axis  $O_1$ ,  $O_2$  and the periods of oscillation  $T_1$ ,  $T_2$  measured.

Plot the position with co-ordinates  $T_1$ ,  $T_2$  on the graph, and read off the values for "a" and "ρ" from the curves. The distance "l" is measured parallel to base line from Station 0 to axis  $O_1$  (diagram 20). If "l" is found close to limit values make sure that base line is level as in the diagram at D.4. The distance "d" can usually be measured from axis  $O_1$  to the underneath of the hull (excluding keelband) by means of a rule or tape passed down through the centreboard box (diagram 20). If this is impossible, use the principle shown in diagram D.9.1 (Height of Mast Step). It is wise to provide a protection under the boat but the boat shall not touch anything while oscillating. The peak to peak movements of the bow shall remain between 200 mm and 160 mm during the time when the period of oscillation is measured. There shall be no twisting oscillations about a vertical axis. There shall be no movement of the supports. The measurement of periods  $T_1$  and  $T_2$  requires most care. It is recommended to operate in the following



way: two time keepers stand on either side of the boat, they shall start their stopwatches when the boat passes the rest position which is made easier with two rods placed opposite each other as in diagram 23; they count ten pitching periods and if they get the same result within 0.1s, the measurement is satisfactory (the result being thus 0.01s accurate).

Stopwatches accurate to 0.05s shall be used. If a stopwatch only accurate to 0.1s is used, twenty pitching periods shall be measured.

If correction is necessary to achieve permissible figures, record only the results obtained after correction.

(See Diagram 22 and 23.)

## ALTERNATIVES TO THE GRAPH

If preferred, a calculator may be programmed to obtain the values of "a" and "ρ".

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*Pocket Calculator programme:*

Input  $T_1$  (sec)                      Input  $T_2$  (sec)

Input  $b=0.2$  (m)                      Input  $g$  (m/sec<sup>2</sup>)

Calculate  $k = \frac{g}{4\pi^2 b}$

Calculate  $a = b \frac{kT_2^2 + 1}{k(T_2^2 - T_1^2) + 2}$

Calculate  $\rho = \sqrt{abkT_1^2 - a^2}$

Show or print  $a$  and  $\square\square\square\square m$

Check program with  $g = 9.81 \text{ m/sec}^2$      $T_1 = 3.31 \text{ sec}$      $T_2 = 3.81 \text{ sec}$

Result should be  $a = 0.593 \text{ m}$      $\rho = 1.124 \text{ m}$

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As another alternative, a simple Computer Spreadsheet can be constructed or obtained from IFA Technical Committee.



## APPENDIX H.4.

### CLASS RULES AMENDMENTS

- H.4.1 Proposals for amendments to these **class rules** may be submitted in time for circulation with the AGM Agenda, for consideration by IFA Council. Proposals may be submitted by IFA Executive members, by IFA Technical Committee and by NFAs.
- H.4.2 In cases of urgency the IFA Executive may prepare submissions to World Sailing without prior reference to IFA Council. IFA Council must be informed and, at the next AGM, may require action as prescribed in H.4.3 or H.4.4.
- H.4.3 Where rule changes of major significance are proposed, the IFA Executive may decide to hold a referendum of all paid-up NFA members.
- H.4.4 If so directed by IFA Council, proposed amendments to these **class rules** shall be prepared by the Chairman of the Technical Committee and submitted to World Sailing in accordance with World Sailing Regulations.

### CLASS RULES INTERPRETATIONS

- H.4.5 The object of these rules is to establish a class of boats which is one-design in all matters that affect basic speed. The rules shall be interpreted in this spirit. Since it is unlikely that these rules can cover in detail every possible eventuality, builders are strongly advised to clear doubtful points with the IFA Technical Committee before starting construction.
- H.4.6 When points are referred to the Technical Committee, the T.C. Chairman shall:
- Provide an opinion; or
  - Consult with the Technical Committee, who shall interpret the rules. Technical Committee interpretations should be made by at least three members. If deemed appropriate, the interpretation should be submitted to IFA Council for ratification, and notified to World Sailing for endorsement.
- H.4.7 The Technical Committee shall be guided by:
- The body lines and section plan, 1964.
  - The plans of the first carvel construction.
  - The digitised tables of coordinates for hull sections, stem and rudder profiles, and for templates.
  - The spirit of the rules.
  - Standard practice in the Finn Class.
- H.4.8 Where a builder or owner does not accept an interpretation of the Technical Committee, or a ratification by IFA Council, the matter shall be referred to World Sailing.
- H.4.9 On the Technical Committee's recommendation, to be ratified or altered by IFA Council or in urgent matters by the Executive Committee, World Sailing may give temporary or permanent dispensation, in which case the Measurer shall enter full details, signed and dated on the boat's Certificate.

END OF DOCUMENT



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