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Class Rules

International 2.4mR Class Association



The 2.4mR Class was introduced as the Mini 12 Class by the Scandinavian Sailing Federation in 1982 and was adopted as a World Sailing class in 1993.

sport / nature / technology



World Sailing
Class Association

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INTRODUCTION

The 2.4 mR Class is a development class.

The rating is calculated according to the formula

$R = (L + 2d - F + \sqrt{S}) / 2.37$ see Part III Section H

The purpose of these rules is to give a designer the possibilities to develop and produce a fast boat within the limitations of these rules. Because of that these rules are **open class rules**.

Owners and crews should be aware that compliance with rules in Section C is NOT completely 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 Equipment Rules of Sailing Part I and in the Racing Rules of Sailing.

This introduction only provides an informal background and the International 2.4 mR Class Rules proper begin on the next page.

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.2 ABBREVIATIONS

- A.2.1 WS World Sailing
- MNA World Sailing Member National Authority
- ICA International 2.4 mR Class Association
- NCA National Class 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 WS which shall co-operate with the ICA 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 ICA,
 - an NCA.
 - the **certification authority**, CA
 - 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 World Sailing.

A.4 ADMINISTRATION OF THE CLASS

- A.4.1 WORLD SAILING 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 WORLD SAILING RULES

- A.5.1 These **class rules** shall be read in conjunction with the 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.6 SAILING INSTRUCTIONS

- A.6.1 These **class rules** shall not be varied by sailing instructions except as provided by A.6.2.
- A.6.2 At World, Continental or Regional Championships the sailing instructions may vary these **class rules** only with the agreement of the ICA.

A.7 CLASS RULES AMENDMENTS

- A.7.1 Amendments to these **class rules** shall be proposed by the ICA and require to be approved by WS in accordance with WS Regulations.

A.8 CLASS RULES INTERPRETATIONS

A.8.1 GENERAL

Interpretation of **class rules**, except as provided by A.8.2, shall be made in accordance with WS Regulations.

A.8.2 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. Such interpretation shall only be valid during the event and the organising authority shall, as soon as practical after the event, inform WS, the MNA and the ICA.

A.9 INTERNATIONAL CLASS FEE(S) AND WORLD SAILING/WS BUILDING PLAQUE

- A.9.1 The builder shall pay the International Class Fee(s).
- A.9.2 WS shall, after having received the International Class Fee for the hull, send the WORLD SAILING/WS Building Plaque to the hull builder. Measurement forms are available at the World Sailing and/or the class website.

A.10 SAIL NUMBERS

- A.10.1 Sail numbers shall be issued by the MNA or the NCA.
- A.10.2 Sail numbers shall be issued either:
- a) in consecutive order starting at “1” or
 - b) World Sailing plaque numbers.
- A.10.3 Personal sail numbers may be used after decision by the MNA or the NCA. Personal sail numbers shall not conflict with existing sail numbers of active boats.
- A.10.4 Sailors may use sail numbers assigned to them by the MNA or the NCA that do not correspond with the sail number on the measurement **certificate**.

A.11 CERTIFICATION

- A.11.1 For a **boat** not previously **certified**, all items required by the **certification control** form to be measured shall be measured by an **official measurer** and the details entered

onto the form. The declarations on the form shall be signed by the builder and the **official measurer**.

- A.11.2 The **certification control** form and **certification** fee if required, shall be sent to the **certification authority** in the country where the **boat** is to be registered after completion of measurement.
- A.11.3 Upon receipt of a satisfactorily completed measurement form and **certification** fee if required within the time limit, the **certification authority** shall issue a **certificate**.
- A.11.4 The **certification authority** shall retain the original measurement form, which shall be transferred to the new **certification authority** upon request if the **boat** is exported.

A.12 VALIDITY OF CERTIFICATES

- A.12.1 A **certificate** becomes invalid upon:
 - (a) Change of ownership,
 - (b) Withdrawal by the **certification authority**,
 - (c) The issue of another **certificate**,

A.13 COMPLIANCE WITH CLASS RULES

- A.13.1 A **boat** ceases to comply with the **class rules** upon:
 - (a) The use of equipment which does not comply with the **class rules**,
 - (b) The use of equipment that does not comply, or that causes the **boat** not to comply, with limitations recorded on the **certificate**,
 - (c) Alteration or repair to items required by the measurement form to be measured, other than permitted routine maintenance,
 - (e) Boats measured and certificated before 31st March 1988, and boats measured and certificated before 1st March 1993 and produced from a mould built before 31st March 1988 are excepted from the following rules
 - (1) Rule D.6.5 re the calculation value of freeboard,
 - (2) Rule D.8.2 re hollows
 - (3) Rule E.5.2 re internal ballast,
 - (4) Rule E.3.3 re keels (date of exception 1st Nov 1988),
 - (5) Rule D.4.2 (c) re deck openings,
 - (6) Rule D.5.1 re flotation. Boats still are entitled to follow rule C.5.2 (b).
 - (f) Boats with fundamental measurement made before 1st March 2004 are excepted from rule D.5.1

A.14 RE-CERTIFICATION

- A.14.1 A **boat** may be re-certified by the issue of a new **certificate**, showing dates of initial and new **fundamental measurement** as applicable:
 - (a) **WHEN A CERTIFICATE BECOMES INVALID UPON CHANGE OF OWNERSHIP**

The new owner shall apply for re-certification by sending the old **certificate**, and fee if required, to the CA in the country where the **boat** is to be re-certified. If this CA is different from the previous CA then the new CA should receive the **boat** measurement form from the old CA prior to re-certification. The new CA may issue the **boat** a new identification number.

- (b) WHEN A CERTIFICATE HAS BEEN WITHDRAWN, OR WHEN THE CERTIFICATE AND MEASUREMENT FORM(S) CANNOT BE LOCATED

The owner shall arrange for **fundamental measurement** as required for initial **certification** and then apply for re-certification by sending the **boat** measurement form, and fee if required, to the CA in the country where the **boat** is to be re-certified. The new CA may issue the **boat** a new identification number.

- A.14.2 When a **boat** has ceased to comply with its **certificate**, it may be brought into compliance:

- (a) WHEN THE LIMITATIONS AFFECTING THE EQUIPMENT ARE CONTROLLED BY THE CLASS RULES

By carrying out **fundamental measurement** of the affected equipment,

- (b) WHEN THE LIMITATIONS AFFECTING THE EQUIPMENT ARE ON THE CERTIFICATE

By carrying out **fundamental measurement** of affected equipment as required for initial **certification**.

A.15 BUOYANCY CERTIFICATE

- A.15.1 The ICA Buoyancy **Certificate** shall state the WS/WORLD SAILING plaque number, the date of confirmation and the name and signature of the confirming individual.
- A.15.2 The buoyancy check shall be carried out and the ICA Buoyancy **Certificate** completed and signed by an **official measurer** or a competent individual assigned by the Technical Committee.
- A.15.3 The buoyancy check shall be performed following the method given in Rule B.4.
- A.15.4 The ICA Buoyancy **Certificate** is valid for a maximum of five (5) years from the date of confirmation.

Section B – Boat Eligibility

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

B.1 CERTIFICATE

B.1.1 The **boat** shall:

- (a) be in compliance with **class rules**
- (b) have a valid **certificate**
- (c) have a valid ICA Buoyancy **certificate**.

B.2 CERTIFICATION MARKS

B.2.1 Items that require **certification marks** shall be so marked.

B.3 MEASUREMENT MARKS

B.3.1 Measurement marks according to D.9.2 shall be placed on the **hull**.

B.4 BUOYANCY CHECKS

B.4.1 A *race committee* may require that a **boat** shall pass a buoyancy check in accordance with B.4.2, B.4.3 and B.4.4.

B.4.2 **CONDITION OF THE BOAT**

The **boat** shall be in racing condition according to Rule C.5.1 and C.5.2. Hatches to watertight compartments, if any, shall be opened in order to let the tanks to be filled with water.

B.4.3 **EXECUTION OF THE CHECK**

The **boat** shall be filled with water until water flows out of the cockpit, it shall thereafter be tilted over to starboard, to port, to the bow and to the stern in order to let the air enclosed under deck and other parts of the hull to come out.

B.4.4 **REQUIREMENTS**

The **boat** shall float in an approximately horizontal position.

B.5 WS PLAQUE

B.5.1 A WORLD SAILING/WS plaque shall be fixed to the inside of the hull in the cockpit on the port side on a visible location.

B.5.2 Boats measured and certified before 1st July 1994 and provided with a plaque issued by the Scandinavian Sailing Federation may have that plaque instead of WS/WORLD SAILING plaque.

B.6 CLASS ASSOCIATION MEMBERSHIP

B.6.1 For a **boat** to be eligible for racing in a World Championship or Continental Championship the helmsman must be a current member of 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 **fundamental measurement**. Except for C.5 and C.8.2 (b) (2).

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

Section C – Conditions for Racing

C.1 GENERAL

C.1.1 RULES

- (a) The ERS Part I – Use of Equipment shall apply
- (b) The following RRS rule shall not apply:
 - (1) RRS 52

C.2 CREW

C.2.1 LIMITATIONS

- (a) The **crew** shall consist of one person.
- (b) Both the legs and the main part of the torso shall be below deck and inside the sheerline.

C.3 ADVERTISING

C.3.1 LIMITATIONS

Advertising shall only be displayed in accordance with the WS Advertising Code, Regulation 20.

C.4 PORTABLE EQUIPMENT

C.4.1 FOR USE

- (a) OPTIONAL
 - (1) One anchor, one chain and one warp. The weight of anchor, chain and warp shall not exceed 2.00 kg. Minimum weight of the anchor shall be 1.0 kg. The Notice of Race or Sailing Instructions may make its use mandatory.
 - (2) One or more electrical pumps.

C.4.2 NOT FOR USE

- (a) MANDATORY
 - (1) Towing rope minimum 9m long of not less than 5mm in diameter and of material that floats.

C.5 BOAT

C.5.1 WEIGHT

The weight of the boat in dry condition shall comply with that as stated in the **certificate**.

(a) The following portable and installed equipment shall be on board when measuring:

Fittings and equipment in D.9.1.

Equipment in C.4.1 (a)(2) if this will be on board when racing.

Equipment in C.4.2 (a)(1)

(b) The following installed equipment may be removed when measuring, removable equipment shall be capable of removal without tools:

(1) Seat consisting of a seat bottom and/or backrest and excludes any hull internal structure. No part of a removable seat shall be below floor level except fixing tabs with a maximum projection of 100mm. The maximum weight of any removable seat shall be 5kg.

(2) **Headsail Boom** excluding any **running rigging**.

C.5.2 FLOTATION

(a) The **hull** shall have flotation elements according to D.5.1.

(b) The **boat** shall float in an approximate horizontal position when flooded and with an additional weight of 35kg of cast iron or denser material, placed within 100 mm of the 0.55xLWL station.

(c) **Hulls** with air tank(s) shall contain flotation element(s) and the flotation shall be checked according to (b) with the tank(s) filled with water.

(d) For flotation check confirmation see B.4.

C.6 HULL

C.6.1 MODIFICATIONS AND MAINTENANCE

(a) Maintenance is permitted without re-measurement and re-**certification** as long as the factors that are influencing the rating are not changed and no limitations or restrictions are exceeded.

(b) If any part of the **hull shell** and **deck** is modified or repaired in any other way than described in C.6.1(a), an **official measurer** shall check the rating, taking the changes into account and enter the changes onto the measurement form. A new certificate shall then be issued according to A.11 and A.14.

C.7 HULL APPENDAGES

C.7.1 LIMITATIONS

(a) **Hull appendages** shall not be changed during an event of less than 8 consecutive days, except when a **hull appendage** has been lost or damaged beyond repair.

C.8 RIG

C.8.1 LIMITATIONS

- (a) Only one set of **spars** and standing **rigging** shall be used during an event of less than 8 consecutive days, except when an item has been lost or damaged beyond repair.

C.8.2 MAST

(a) DIMENSIONS

	minimum	maximum
Limit mark width	10 mm	
Mast spar curvature at a distance of 2700 mm from the mast datum point		30 mm

(b) USE

- (1) The **spar** shall be stepped in the mast step in such a way that the heel is not capable of moving more than 10mm athwart ships.
- (2) The **mast datum point** shall not be above the measurement point of the deck (See D.2.2), regardless of the mast rake.
- (3) Rotating masts are not permitted.

C.8.3 BOOM

(a) DIMENSIONS

	minimum	maximum
Limit mark width	10 mm	
Outer point distance	according to certificate,.....	E
Boom spar curvature at a distance of 1000 mm from the outer limit mark		15 mm

(b) USE

The intersection of the aft edge of the mast **spar** and the top of the boom **spar**, each extended as necessary, shall not be below the upper edge of the mast **lower limit mark** when the boom **spar** is at 90° to the mast **spar**.

C.8.4 STANDING RIGGING

(a) DIMENSIONS

Fore triangle base	according to certificate.....	J
---------------------------------	-------------------------------	---

(b) USE

Whilst racing the mast is not permitted to be adjusted in an athwartships plane to windward of a plane perpendicular to the deck. The shrouds of boats with adjustable shrouds must be able to be tightened to their upward limit on both sides at the same time.

C.9 SAILS

C.9.1 LIMITATIONS

- (a) Not more than 2 mainsails and 3 jibs shall be used during an event of the status National Championship or higher and of less than 8 consecutive days, except when a **sail** has been lost or damaged beyond repair.

C.9.2 MAINSAIL

(a) USE

- (1) The **sail** shall be hoisted on a halyard. The arrangement shall permit hoisting and lowering of the **sail** at sea.
- (2) The **tack point** of the sail shall not be set below the **lower point**. The **clew point** of the sail, projected at 90° to the boom **spar**, shall not be set aft of the **outer point**.

C.9.3 JIB

(a) USE

- (1) The highest point of the **sail**, projected at 90° to the mast **spar**, shall not be set above the **forestay rigging point**.
- (2) The **sail** shall be hoisted on a halyard. The arrangement shall permit lowering the sail at sea so that no part of it is above a plane 1800 mm above the **mast datum point**. From there it shall be possible to hoist it again to its original position.
- (3) The **tack** shall not be attached to any point on the boat that is in front of the forestay.
- (4) Headsails designed to be used with headsail booms shall not be used without a **headsail boom**.

Section D – Hull

D.1 PARTS

D.1.1 MANDATORY

- (a) Hull shell
- (b) Deck
- (c) Buoyancy Equipment

D.2 GENERAL

D.2.1 RULES

- (a) The **hull** shall comply with the current **class rules** with the exceptions stated in A.13.1(d) and A.13.1(e).

D.2.2 DEFINITION

- (a) Measurement point of the deck
The measurement point of the deck is a point, at the mast hole section, 36mm above the deck level, measured 15mm from the outmost part of the hull shell in this section.

D.2.3 IDENTIFICATION

- (a) The hull shall carry the World Sailing Plaque. See B.5.

D.3 HULL

D.3.1 MATERIALS

- (a) The **hull**, excluding fittings, breakwater and corrector weights, shall be built from wood and/or Glass Reinforced Plastic. Aluminium alloy reinforcement plates are permitted where it is needed for mounting fittings. Tube housing for rudderstock and post for attaching the bilge pump may be of any material. However, lead is only permitted for **ballast** and **corrector weights**.

D.3.2 CONSTRUCTION

- (a) The exterior hull mouldings shall weigh not less than 3.6kg/m^2 .
- (b) Where sandwich construction is used, the core material shall be of density not less than 60kg/m^3 .
- (c) For boats initially **certified** after the 3rd June 2013, the builder shall issue a manufacturer's declaration certifying the compliance with rules D.3.1 (a) and D.3.2 (a) and (b), using the ICA Builders Declaration Form.

D.4 DECK

D.4.1 MATERIALS

- (a) The deck shall be built from wood and/or Glass Reinforced Plastic.

D.4.2 CONSTRUCTION

- (a) The exterior hull mouldings shall weigh not less than 3.6kg/m^2 .

- (b) Where sandwich construction is used, the core shall be of density not less than 60kg/m³.
- (c) The total area of deck openings shall not be more than 0.7m².
- (d) No part of the cockpit opening shall be closer to the **sheerline** than 100mm
- (e) For boats initially **certified** after the 3rd June 2013, the builder shall issue a manufacturer's declaration certifying the compliance with rules D.4.1 (a) and D.4.2 (a) and (b), using the ICA Builders Declaration Form.

D.5 BUOYANCY EQUIPMENT

D.5.1 CONSTRUCTION

- (a) Buoyancy equipment shall comprise of rigid non-communicating air cell foam plastic incorporated into the **boat**.
- (b) The buoyancy equipment shall be constructed such that it cannot leave the **boat** when the **boat** is flooded.
- (c) Watertight compartments shall allow for inspection with a hatch opening of minimum 100 mm in diameter. The highest point of the opening shall be placed no more than 50mm below the underside of the **deck**.

D.6 DIMENSIONS FOR CALCULATING THE RATING

D.6.1 GENERAL

- (a) The rating is calculated according to Part III, Section H, clause H.1
- (b) Determination of waterline, waterline length (LWL), length L, L1 sections and L2 section shall be made according to Measurement Diagrams in Part III, Section H, clause H.4.
- (c) The waterline shall be controlled by placing the boat in a water tank and loading it according to H.2. The **official measurer** shall issue a declaration or state on the measurement form that the correct procedure was followed.
- (d) The girth at each section shall be the shortest chain girth between the measurement points (O or sheerline) through the measurement point at L1/L2. (See D.6.3 (a) (1) and D.9.2 (a)).

D.6.2 WATERLINE LENGTH

- (a) The waterline length (LWL) shall be measured between the forward "L" mark (See H.4, D.8.2 and D.9.2 (a)) and aft most of :
 1. The part of the hull at or below the LWL including any attachments to the hull but excluding the rudder and normal rudder hangings, or
 2. The centre of the axis of the rudder stock.

D.6.3 LENGTH

- (a) The length "L" for the formula shall be the sum of:
 - (1) The length measured 36mm above the waterline (LWL) measured between the inner edges of the L1 marks (L1-sections)(See also D.8.2); and

- (2) 1.5 times the difference between the chain girth at the bow end of this length (the bow section) measured to points 120mm above the L1 mark and 240mm; and
 - (3) 1/3 of the difference between the chain girth from **sheerline** to **sheerline** at the aft end of this length (the stern section) and twice the vertical height at the side of the yacht at this section.
- (b) For calculating the rating the difference in (2) (the bow section) shall not be less than 72mm; and the difference in (3) (the stern section) shall not be less than 240mm.
 - (c) The L2-section is a section intersecting the aft overhang at a height of 72mm above LWL. If the girth difference at the L2-section is less than 65 per cent of the stern girth difference at L1, 1/3 of the deficiency shall be added to the stern girth difference in calculating the rating. The girth difference at the L2 section is the chain girth from **sheerline** to **sheerline** (or the intersection of the sides of the yacht with the transom) less twice the vertical height at this section.
 - (d) The aft end of the length L (the stern section L1) shall not be nearer the bow than the centre of the axis of the rudder stock.

D.6.4 MIDSHIP GIRTH DIFFERENCE

- (a) The midship girth difference “d” is the sum of the difference between the skin girth and chain girth on the port and starboard sides of the yacht measured at the section 0.55 LWL from the forward end of the LWL.
- (b) The skin girth is the measurement along the surface of the hull from the **sheerline**, through the upper mark “d” and the I mark (immersion mark see D.9.2 (b)) to points on the surface of the hull 300mm below the LWL, lower mark “d1”. The chain girth is the measurement between the same points with the measuring tape pulled taut.
- (c) The yacht shall be so designed that it is possible to place the “d1” marks on the surface of the hull or the keel and to measure a continuous skin girth at the station. The radius of the hull, measured in any horizontal plane at or above the “d1” mark, shall not be less than 600mm. Local bridging by a strut to reduce the d measurement is not permitted.

D.6.5 FREEBOARD

- (a) The freeboard “F” shall be a third of the sum of the freeboards (the vertical distance from sheer line to LWL) at the bow and stern endings of L1 plus the freeboard at the midship girth section. The word “freeboard” at each section means the mean of starboard and port readings.
- (b) When calculating the rating the freeboard aft shall not be taken as more than 0.95 times of the freeboard forward, and the freeboard forward shall not be taken as more than 1.5 times the freeboard midships. The actual freeboard forward shall not be less than 1.1 times the freeboard midships.
- (c) When calculating the rating the calculating value of “F” shall not be more than 292mm.

D.7 LIMITATIONS WITH RATING PENALTIES

D.7.1 DRAFT

- (a) The maximum draft without penalty shall be 1000mm.
- (b) If the draft exceeds that allowed in (a), three times the excess shall be added to the rating.
- (c) The draft shall be taken as the vertical distance below the LWL to the lowest point of the hull or hull appendage in any position.

D.7.2 DISPLACEMENT

- (a) The displacement of the yacht including the additional 35kg ballast (see H.2) in cubic metres shall be not less than $(0.2 \times \text{LWL} + 0.06)^3$.
- (b) The measured displacement shall be determined for sea water of specific gravity of 1.025. See H.3
- (b) If a yacht has a displacement less than required by (a), twice the difference between the length of the LWL to which her actual displacement corresponds by the rule and her actual length on LWL shall be added to the length measurement "L" in the rating formula.

D.7.3 BEAM

- (a) The beam, measured at the point of the greatest beam in the plane one-third of the freeboard at the midship girth station above the LWL shall not be less than 720mm.
- (b) If the beam is less than required by (a), 4 times the deficiency shall be added to the length measurement "L" in the rating formula.

D.7.4 TUMBLE HOME

- (a) The tumble home on the side of the yacht shall not exceed 15mm.
- (b) If the tumble home exceeds that allowed in (a), three times the excess shall be added to the rating.

D.8 LIMITATIONS

D.8.1 SHEERLINE

- (a) From a point 75mm abaft the foremost point of the hull to the stern section at L1 the **sheerline** shall form a continuous, even, concave curve.

D.8.2 HOLLOWES

- (a) There shall be no hollows in the surface of the hull between the LWL plane and the **sheerline** except an area at the stern between the buttock lines 100mm from the yacht centreline and below L1.

For the purpose of rating, any hollows in the entry of the boat below the LWL plane shall be bridged by a straight line from points on the entry at a vertical distance of 30mm above and below the LWL plane.

D.8.3 AFTERBODY

- (a) The afterbody of the yacht shall be so shaped that an aft chain girth can be taken at the section L2. See D.6.3 (c). The horizontal distance between L1 and L2 shall not be less than 76mm.

D.9 ASSEMBLED HULL

D.9.1 FITTINGS AND EQUIPMENT

(a) MANDATORY

The following fittings and equipment shall be installed:

- (1) A suitable fitting or system in the bow area to enable the boat to be towed. The fitting/system shall be easy to access by rescue craft, and shall be able to handle line of at least 5mm in diameter.
- (2) One manual bilge pump with a minimum capacity of 0.5 litre/stroke.
- (3) A suitable fitting or device shall be installed in the deck level, in order to prevent the mast to move astern of that position, which corresponds to the **Foretriangle base, J**, according to G.4.2.

D.9.2 MEASUREMENT MARKS

The following measurement points shall be outlined with marks painted or fastened (adhesive tape) to the hull:

(a) A mark not less than 60 x 10mm:

- 1) At ends of LWL (L)
- 2) At ends of measured length (L1)
- 3) At L2

The inner edges of the marks denote the measurement point.

(b) An immersion mark at 0,55 x LWL from the forward end of LWL, a triangular mark (a right-angled triangle with a hypotenuse of 50mm). The bottom corner of the immersion mark denotes the measurement point.

(c) A round mark of 10mm diameter

- 1) At the freeboard points above L1 forward and at stern,
- 2) At the freeboard point above the immersion marks 0.55 x LWL
- 3) At d1 in the midship girth station
- 4) At the point 120mm above forward L1.

(See also H.4).

Section E – Hull Appendages

E.1 PARTS

E.1.1 MANDATORY

- (a) **Keel**
- (b) **Rudder**
- (c) **Ballast**

E.2 GENERAL

E.2.1 RULES

- (a) The **hull appendages** shall comply with the current **class rules** with the exceptions stated in A.13.1 (d)

E.3 KEEL

E.3.1 MATERIALS

- (a) See D.3.1.

E.3.2 CONSTRUCTION

- (a) See D.3.2.
- (b) Only one **keel** is permitted. The **keel** shall be fixed and shall have no moving parts.

E.3.3 DIMENSIONS

- (a) No horizontal **keel** section shall be longer or wider than any of the horizontal keel sections above.

E.4 RUDDER BLADE AND RUDDER STOCK

E.4.1 RULES

- (a) The **rudder** blade and **rudderstock** shall comply with the current **class rules** with the exceptions stated in A.13.1 (d)

E.4.2 MATERIALS

- (a) The **rudder** blade shall be made of one or a combination of the following materials: Glass Reinforced Plastic, wood or polyurethane foam.
- (b) The **rudderstock** shall be of stainless steel or aluminium.

E.4.3 DIMENSIONS

- (a) Any part of the **rudder**, measured athwartships shall not exceed 38mm when the **rudder** extends beyond the aft end of the water line.

E.5 BALLAST

E.5.1 MATERIALS

- (a) The density of the **ballast** materials shall not be greater than the density of lead.

E.5.2 CONSTRUCTION

- (a) The ballast shall be internal in the boat and shall be removable from the inside of the boat.
- (b) The lead **ballast** shall consist of minimum 8 pieces and maximum 16 pieces. The maximum weight of one piece is 35kg.

Section F – Rig

F.1 PARTS

F.1.1 MANDATORY

- (a) **Mast**
- (b) **Boom**
- (c) Standing **rigging**
- (d) Running **rigging**

F.1.2 OPTIONAL

- (a) **Whisker pole**
- (b) Headsail Boom

F.1.3 PROHIBITED

Other **spars** than those listed in F.1.1 and F.1.2.

F.2 GENERAL

F.2.1 RULES

- (a) The spars and their fittings shall comply with the current **class rules** with the exceptions stated in A.13.1 (d).

F.2.2 MEASUREMENT BANDS

- (a) Measurement bands shall be according to C.8.2 (a) and C.8.3 (a).

F.2.3 DEFINITIONS

- (a) **Mast Datum Point**

The **mast datum point** is a point on the fore side of the mast given by the **forestay height** I according to the design measured from the **rigging point**. See G.2.4 and G.4.2. The **mast datum point** shall be marked by a punch.

F.3 MAST

F.3.1 MATERIALS

- (a) The **spar** excluding fittings and corrector weights shall be of either wood, Glass Reinforced Plastic or aluminium alloy.

F.3.2 CONSTRUCTION

- (a) The **spar** extrusion shall include a fixed sail groove or track which may or may not be integral with the **spar** but shall be of the same material.

F.3.4 DIMENSIONS

	minimum	maximum
Mast spar cross section at upper point		
fore-and-aft	28mm	66mm
transverse	24mm	

Mast spar cross section between the **mast datum point** and a point 3500mm above

Fore-and-aft	56mm	66mm
Transverse.....	38mm	

Between the point 3500mm above the datum point and the upper point the profile of the mast may have a fair rounding taper.

Upper point height 5000mm

Lower point height 250mm

Lower point to upper point according to design see G.2.4 and G.3.3 P

Forestay height according to design see G.2.4 and G.4.2 I

F.3.5 WEIGHTS

	minimum	maximum
Mast weight	6.50kg	
Tip weight	2.0kg	

F.4 BOOM

F.4.1 MATERIALS

(a) The **spar** excluding fittings shall be of wood, Glass Reinforced Plastic or aluminium alloy.

F.4.2 CONSTRUCTION

(a) The **spar** including any groove or track shall be of the same material.

F.4.3 DIMENSIONS

	minimum	maximum
Boom spar cross section between the mast and the outer point		
vertical	75mm	
transverse	27mm	55mm

F.5 WHISKER POLE

F.5.1 MATERIALS

(a) The **spar** excluding fittings shall be made of one or a combination of the following materials: wood, Glass Reinforced Plastic or aluminium alloy.

F.5.2 DIMENSIONS

		maximum
Whisker pole length	according to design see G.2.4 and G.4.2	1.35 x J

F.6 STANDING RIGGING

F.6.1 CONSTRUCTION

(a) MANDATORY

- (1) A forestay
- (2) Shrouds

Section G – Sails

G.1 PARTS

G.1.1 MANDATORY

- (a) Mainsail
- (b) Headsail

G.1.2 PROHIBITED

Other **sails** than those listed in G.1.1.

G.2 GENERAL

G.2.1 RULES

- (a) **Sails** shall comply with the **class rules** in force at the time of **certification**.

G.2.2 CERTIFICATION

- (a) It is permitted to measure sails with battens in place.
- (b) The official measurer shall certify mainsails and headsails in the tack and shall sign and date the certification mark.
- (c) An MNA may appoint one or more persons at a sailmaker to measure and certify sails produced by that manufacturer in accordance with World Sailing guidelines.
- (d) On the certification mark it shall be stated what design the sail is made for:
 - (1) Main sail: The measure E according to G.3.3
 - (2) Head sail: The measure J according to G.4.2

G.2.3 SAIL PLAN

- (a) The sail area (S) is the sum of the calculated rated areas of mainsail, G.3.3, and fore-triangle, G.4.2.

G.2.4 DEFINITIONS

- (a) P = The distance between the **Upper Point** and the **Lower Point** See F.3.4
- (b) E = **Outer Point Distance** See C.8.3.
- (c) I = **Forestay height**
- (d) J = **Foretriangle Base**
- (e) **Upper Leech Point** is located at 500mm from the **Head Point**

G.3 MAINSAIL

G.3.1 IDENTIFICATION

- (a) The class insignia shall conform with the dimensions, colours and requirements as detailed in the diagram contained in Section J.
- (b) As an alteration to RRS APPENDIX G 1.3, the Insignia may be placed on the starboard side only.
- (c) As an alteration to RRS APPENDIX G1.2 b), the national letters and sail numbers shall be of the following minimum dimensions:

Height	250mm
--------	-------

Thickness	30mm
Space between adjoining letters and numbers	45mm

G.3.2 CONSTRUCTION

- (a) The construction shall be: **single-ply sail**.
- (b) The **sail** shall have not more than 4 **batten pockets** equally spaced along the **leech** with a tolerance of +/- 50mm.

G.3.3 MAINSAIL AREA

- (a) The rated area of a mainsail is:
 $0.5 \times P \times E$

G.3.4 DIMENSIONS

	maximum
Half width	0.68 x E
Three-quarter width	0.41 x E
Upper width	0.19 x E
Top width	72mm
Foot Median	1.054 x P
Upper batten pocket outside length	Unlimited
Lowermost and intermediate batten pocket outside length	680mm

G.4 HEADSAIL

G.4.1 CONSTRUCTION

- (a) The construction shall be: **single-ply sail**.
- (b) One cringle / tie attachment point is permitted at the **tack point** of the **sail**.

G.4.2 FORE-TRIANGLE AREA

- (a) The rated area of the fore-triangle is:
 $0.5 \times 0.85 \times I \times J$
- (b) I shall not exceed 3750mm.

G.4.3 TYPES OF HEADSAILS

- (a) **Headsail** with or without battens, 110% of J
- (b) **Headsail** with or without battens, 95% of J

G.4.4 DIMENSIONS OF HEADSAIL, 110% OF J

	Minimum	Maximum
Foot length	1.10 x J	
Three-quarter width	0.28 x J	
Half width	0.53 x J	
Top width	40mm	
Foot Median	1.043 x I	
Number of battens	3	
Batten length (outside)	400mm	

Head point to intersection of **leech** and centreline of
uppermost **batten pocket**700mm
Clew point to intersection of **leech** and centreline of
lowermost **batten pocket** 700mm

G.4.5 DIMENSIONS OF HEADSAIL, 95% OF J

	minimum	maximum
Foot length		0.95 x J
Three-quarter width		0.30 x J
Half width		0.545 x J
Top width		40mm
Foot Median		1.043 x I
Number of battens		3
Batten length (outside).....		400mm
Head point to intersection of leech and centreline of uppermost batten pocket		700mm
Clew point to intersection of leech and centreline of lowermost batten pocket		700mm

PART III – APPENDICES

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

Section H -Rating

H.1 RATING FORMULA

$$\text{Rating } R = (L + 2d - F + \sqrt{S}) / 2.37$$

The Rating R shall be: $R \leq 2,400$

Where L = the length according to D.6.3

d = the midship girth difference according to D.6.4

F = the freeboard height according to D.6.5

S = the total sail area according to G.2.3

The rating, R, and/or the factors in the formula shall be added with penalties, if any, according to D.7.

Calculations shall be carried out to the nearest millimetre.

H.2 WATERLINE LENGTH LWL

The LWL shall be checked with the boat in racing condition according to C.5.1 and with an extra 35kg lead ballast placed within 100mm from 0.55 x LWL from the bow station. The density of water shall be 1.025.

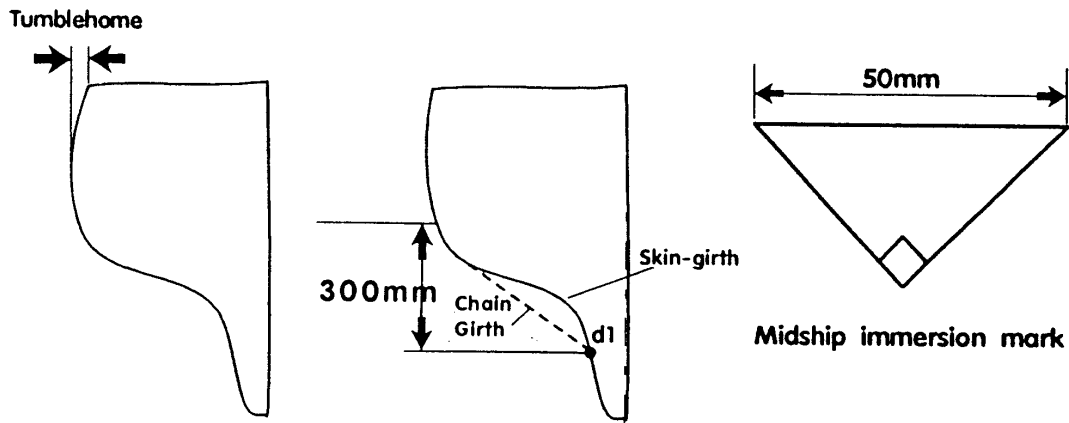
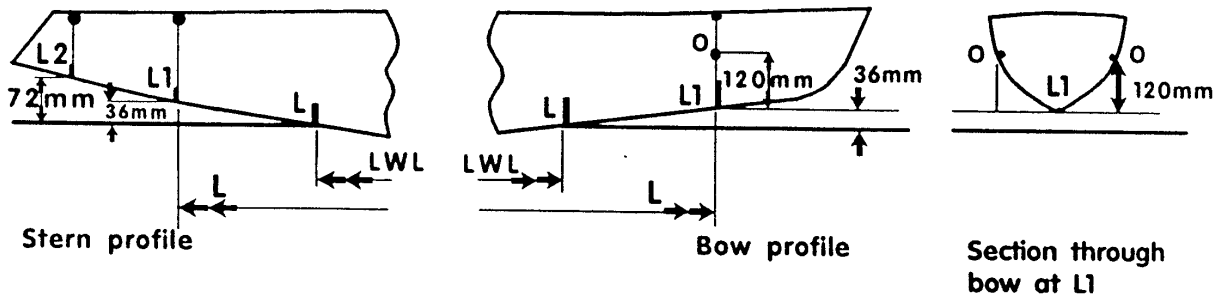
H.3 CHECKING THE WATER LINE MARKS IN WATER WITH SPECIFIC GRAVITY OTHER THAN 1,025

When checking the marks the extra lead ballast of 35kg shall be replaced by another lead ballast with a different weight, ΔQ_1 . This weight and the distance e_1 from the 0,55xL station can be defined accordingly:

Boat weight	Q kg	Distance from 0.55xL	e_1
Displacement	D liters	$D * \rho_0 = Q_{t0} = Q + \Delta Q_0$;	
<i>Salt water</i>		$D * \rho_1 = Q_{t1} = Q + \Delta Q_1$;	
Lead ballast	$\Delta Q_0 = 35\text{kg}$		
Total weight + 35	$Q_{t0} = Q + \Delta Q_0 = Q$	$\Delta Q_1 = Q (\rho_1 / \rho_0 - 1) + \Delta Q_0 * \rho_1 / \rho_0$;	
Specific gravity of water $\rho_0 = 1,025$		$e_1 = e_0 * \Delta Q_0 / \Delta Q_1$	
Distance from 0.55L $e_0 = 100\text{mm}$			
<i>Actual water</i>		For fresh water with $\rho_1 = 1.000$ will give	
Lead ballast	ΔQ_1	$\Delta Q_1 = 35/1,025 - 0,025 * Q / 1,025$	
Total weight	$Q_{t1} = Q + \Delta Q_1$	For a Norlin mark III normally $Q = 254$	
Specific gravity of water ρ_1		kg, will give $\Delta Q_1 = 28.0\text{kg}$ and $e_1 = 125\text{mm}$	

H.4 MEASUREMENT DIAGRAMS

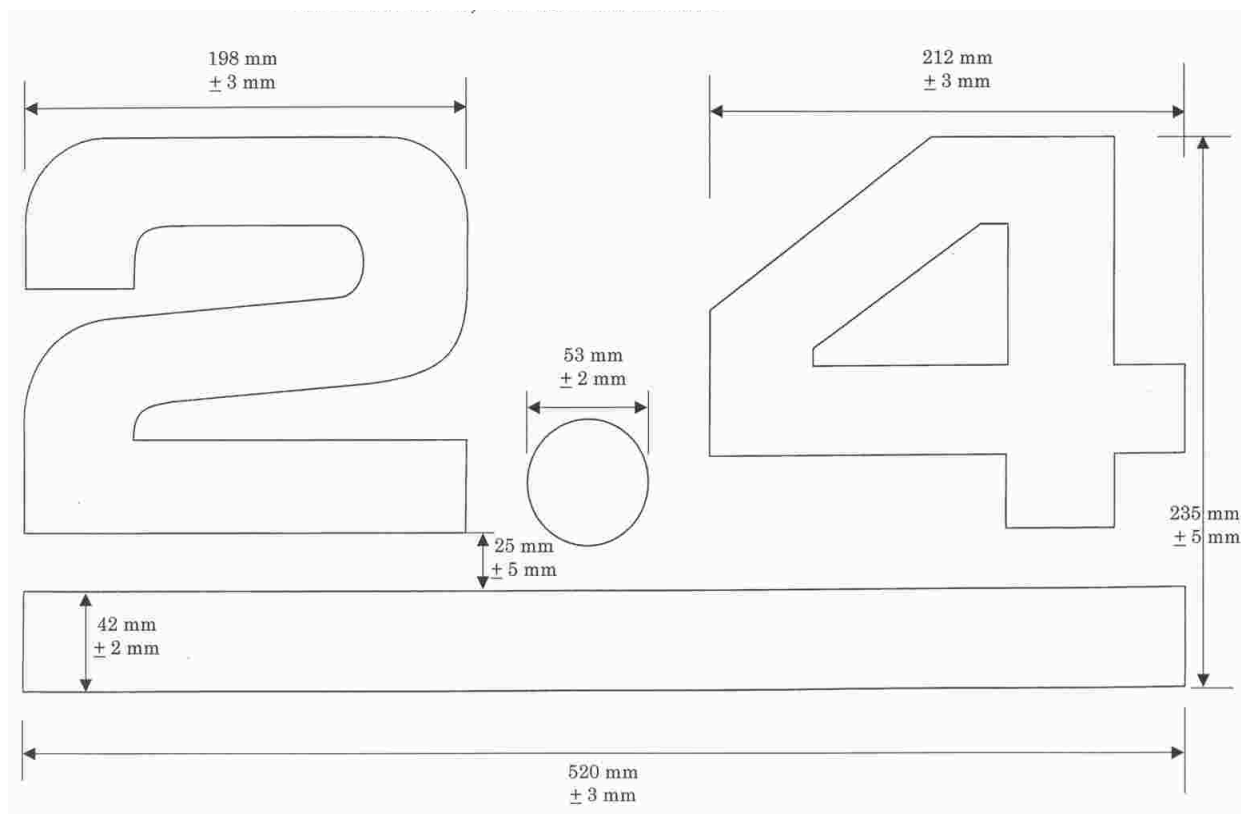
Measurement Diagrams



Midship Cross-section at
0.55 x LWL from forward
end of LWL

Section J – Class Insignia

J.1 CLASS INSIGNIA DIAGRAM



J.2 INSIGNIA COLOURS

The class insignia shall be in blue colour. Current and former champions may have the horizontal line in the insignia in a different colour:

World Champion -	Gold
Continental Champion -	Orange
National Champion -	Green

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