

**INTERNATIONAL**  
**2.4 mR**  
**CLASS RULES**

**2006**



The 2.4m R Class was introduced as the Mini 12 Class by the Scandinavian Sailing Federation in 1982 and was adopted as an international class in 1993.

# INTRODUCTION

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The 2.4 mR Class is a development class.  
The rating is calculated according to the formula:

$$R = \left( \frac{L + 2d - F + \sqrt{S}}{2.37} \right) \text{See Part III, Section H}$$

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.

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# 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.2 ABBREVIATIONS

- A.2.1 ISAF International Sailing Federation
- MNA ISAF 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 the ISAF 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:
  - the ISAF,
  - 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 the ISAF.

### A.4 ADMINISTRATION OF THE CLASS

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

### A.5 ISAF RULES

- A.5.1 These **class rules** shall be read in conjunction with the 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 the ISAF in accordance with the ISAF 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 the ISAF 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 the ISAF, the MNA and the ICA.

## **A.9 INTERNATIONAL CLASS FEE(S) AND ISAF BUILDING PLAQUE**

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

## **A.10 SAIL NUMBERS**

- A.10.1 Sail numbers shall be issued by the MNA.
- A.10.2 Sail number shall be issued in consecutive order starting at “1”.
- A.10.2 Personal sail numbers may be used after decision by the MNA or the NCA.

## **A.11 CERTIFICATION**

- A.11.1 For a **boat** not previously **certified**, all items required by the measurement(s) form to be measured shall be measured by an **official measurer** and the details entered onto the form.
- A.11.2 The measurement 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,
  - (d) A change of **class rules** that causes equipment in use to cease to be permitted, except where the equipment may comply with the **class rules** in force at the time of its initial **fundamental measurement**.
  - (e) Boats measured and certificated before 31<sup>st</sup> March 1988, and boats measured and certificated before 1<sup>st</sup> March 1993 and produced from a mould built before 31<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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**.

## 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 have a valid **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 FLOTATION CHECKS

B.4.1 The **certificate** shall carry a satisfactory flotation check confirmation.

B.4.2 A race committee may require that a **boat** shall pass a flotation test in accordance with C.5.2 (b).

### B.5 ISAF PLAQUE

B.5.1 An ISAF plaque shall be fixed to the inside of the hull near the front of the cockpit on the port side.

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

## 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 **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 rules shall not apply:
  - (1) RRS 50.4
  - (2) 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 Category C of the ISAF Advertising Code.

#### C.4 PORTABLE EQUIPMENT

##### C.4.1 FOR USE

- (a) MANDATORY
  - (1) One Manual bilge pump with a minimum capacity of 0.5 litre/stroke.
- (b) OPTIONAL
  - (1) One anchor. The weight of anchor and chain shall not exceed 2.00 kg.
  - (2) One electrical pump with battery

## C.4.2 NOT FOR USE

### (a) MANDATORY

- (1) Towing rope minimum 5m long of not less than 5mm in diameter.

## C.5 BOAT

### C.5.1 WEIGHT

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

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

Fittings and equipment in D.9.1, C.4.1 (a)

Equipment in C.4.2 (a)

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

### 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 loaded with an extra 35kg lead ballast placed within 100 mm of the 0.55xLWL station.

## 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 hull moulding 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 form. A new certificate shall then be issued on the yacht.

## C.7 HULL APPENDAGES

### C.7.1 LIMITATIONS

- (a) Only one **rudder** blade shall be used 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
<b>Limit mark width</b> .....	10 mm	
<b>Mast spar curvature</b> at a distance of 2700 mm from the <b>mast datum point</b> .....		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).
- (3) Rotating masts are not permitted.

## C.8.3 BOOM

### (a) DIMENSIONS

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

<b>Fore triangle base</b> .....	according to certificate.....	J
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### (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 highest visible point of the **sail**, projected at 90° to the mast **spar**, shall not be set above the lower edge of the mast **upper limit mark**. The intersection of the **leech** and the top of the boom **spar**, each extended as necessary, shall not be behind the fore side of the boom **outer limit mark**.

### C.9.3 JIB

#### (a) USE

- (1) The **sail** shall be hoisted on a halyard. The arrangement shall permit hoisting and lowering of the **sail** at sea.

## Section D – Hull

### D.1 PARTS

#### D.1.1 MANDATORY

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

### 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(e) and A.13.1(f).

#### 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 ISAF Plaque. See B.5.

### D.3 HULL SHELL

#### D.3.1 MATERIALS

- (a) The **hull**, excluding fittings, breakwater and corrector weights, shall be built from wood and/or Glass Reinforced Plastic.

#### D.3.2 CONSTRUCTION

- (a) The exterior hull mouldings shall weigh not less than 3.6kg/m<sup>2</sup>.
- (b) Where sandwich construction is used, the core material shall be of either Balsa wood or PVC foam. The core material shall be of density not less than 60kg/m<sup>3</sup>.

## **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  $3.6\text{kg/m}^2$ .
- (b) Where sandwich construction is used, the core material shall be of either Balsa wood or PVC foam. The core material shall be of density not less than  $60\text{kg/m}^3$ .
- (c) The total area of deck openings shall not be more than  $0.7\text{m}^2$ .
- (d) No part of the cockpit opening shall be closer to the **sheerline** than 100mm.

## **D.5 BUOYANCY TANKS**

### **D.5.1 CONSTRUCTION**

- (a) Buoyancy equipment shall comprise of rigid non-communicating air cell foam plastic incorporated into the yacht.

## **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 girth at each section shall be the shortest chain girth (i.e., “the great circle” distance along the surface of the hull) 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 MIDSHP 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 at the stern within the buttock lines 100mm from the yachts 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 (e)

## **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 **rudder** stock shall comply with the current **class rules** with the exceptions stated in A.13.1 (e)

### **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**.

	Minimum	Maximum
Number of items of <b>Ballast</b> .....	8 items	16 items

# 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**

## 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 (e).

- 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. 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** 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
<b>Mast spar cross section at upper point</b>		
<b>fore-and-aft</b>	28mm	66mm
<b>transverse</b> .....	24mm	
<b>Mast spar cross section between the mast datum point and a point 3500mm above</b>		
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.

<b>Upper point height</b> .....	5000mm
<b>Lower point height</b> .....	250mm
<b>Lower point to upper point</b> .....	acc to design see G.2.4 and G.3.3 P
<b>Forestay height</b> .....	acc to design see G.2.4 and G.4.2 I

F.3.5 WEIGHTS

	minimum	maximum
<b>Mast weight</b> .....	6.50kg	
<b>Tip weight</b> .....	2.0kg	

**F.4 BOOM**

F.4.1 MATERIALS

(a) The **spar** 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
<b>Boom spar cross section</b> between the mast and the outer point		
<b>vertical</b> .....		75mm
<b>transverse</b> .....	27mm	55mm

**F.5 WHISKER POLE**

F.5.1 MATERIALS

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

F.5.2 DIMENSIONS

		maximum
<b>Whisker pole length</b>	according to design see 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.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) The **official measurer** shall **certify** mainsails and headsails in the **tack** and shall sign and date the **certification mark**.
- (b) An MNA may appoint one or more persons at a sailmaker to measure and **certify sails** produced by that manufacturer in accordance with ISAF guidelines.
- (c) 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.

#### G.3.2 CONSTRUCTION

- (a) The construction shall be: **single-ply sail**.
- (b) The **sail** shall have not more than 4 equally spaced batten **pockets** in the **leech**. These equal parts shall be within the tolerances  $\pm 50$ mm.

### G.3.3 MAINSAIL AREA

(a) The rated area of a mainsail is:

$$0.5 \times P \times E$$

### G.3.4 DIMENSIONS

	maximum
<b>Half width</b> .....	0.68 x E
<b>Three-quarter width</b> .....	0.41 x E
<b>Upper width</b> .....	0.19 x E
<b>Top width</b> .....	72mm
<b>Batten pocket length (outside):</b>	
Uppermost batten .....	480mm
Lowermost and intermediate battens .....	680mm

## G.4 HEADSAIL

### G.4.1 CONSTRUCTION

(a) The construction shall be: **single-ply 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 without battens

(b) Headsail with battens

### G.4.4 MEASUREMENTS OF HEADSAIL WITHOUT BATTENS

	maximum
<b>Foot length</b> .....	1.10 x J
<b>Three-quarter width</b> .....	0.28 x J
<b>Half width</b> .....	0.53 x J
<b>Top width</b> .....	40mm

### G.4.5 MEASUREMENTS OF HEADSAIL WITH BATTENS

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

$$\text{Rating } R = \mathbf{R} = \left( \frac{L + 2d - F + \sqrt{S}}{2.37} \right)$$

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,  $\Delta Q_1$ . This weight and the distance  $e_1$  from the 0,55xL station can be defined accordingly :

Boat weight            Q kg  
 Displacement        D liters  
*Salt water*  
 Lead ballast             $\Delta Q_0 = 35\text{kg}$   
 Total weight  
 $Q_{t0} = Q + \Delta Q_0 = Q + 35$   
 Specific gravity of water  $\rho_0 = 1,025$   
 Distance from 0.55L    $e_0 = 100\text{mm}$   
*Actual water*  
 Lead ballast             $\Delta Q_1$   
 Total weight             $Q_{t1} = Q + \Delta Q_1$   
 Specific gravity of water             $\rho_1$   
 Distance from 0.55xL             $e_1$   
 $D * \rho_0 = Q_{t0} = Q + \Delta Q_0 ;$

$$D * \rho_1 = Q_{t1} = Q + \Delta Q_1 ;$$

$$\Delta Q_1 = Q \left( \frac{\rho_1}{\rho_0 - 1} \right) + \Delta Q_0 \left( \frac{\rho_1}{\rho_0} \right) ;$$

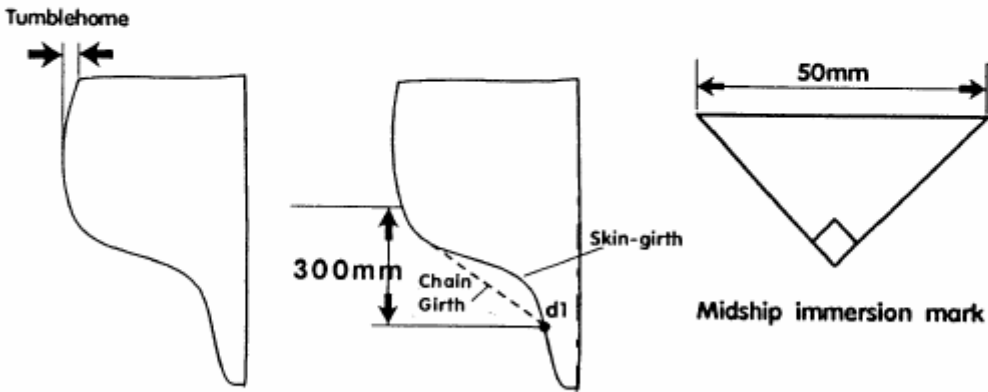
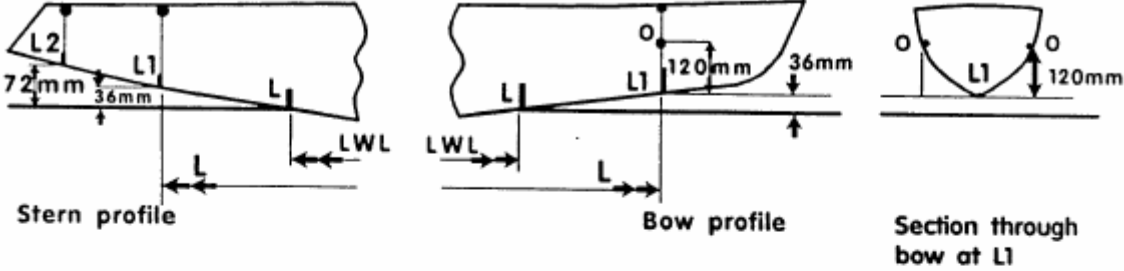
$$e_1 = e_0 \left( \frac{\Delta Q_0}{\Delta Q_1} \right)$$

**For fresh water** with  $\rho_1 = 1.000$  will give

$$\Delta Q_1 = \frac{35}{1.025} - 0.025 \left( \frac{Q}{1.025} \right)$$

For a Norlin mark III normally  $Q = 259\text{kg}$ , will give  $\Delta Q_1 = 27,8\text{kg}$  and  $e_1 = 126\text{mm}$

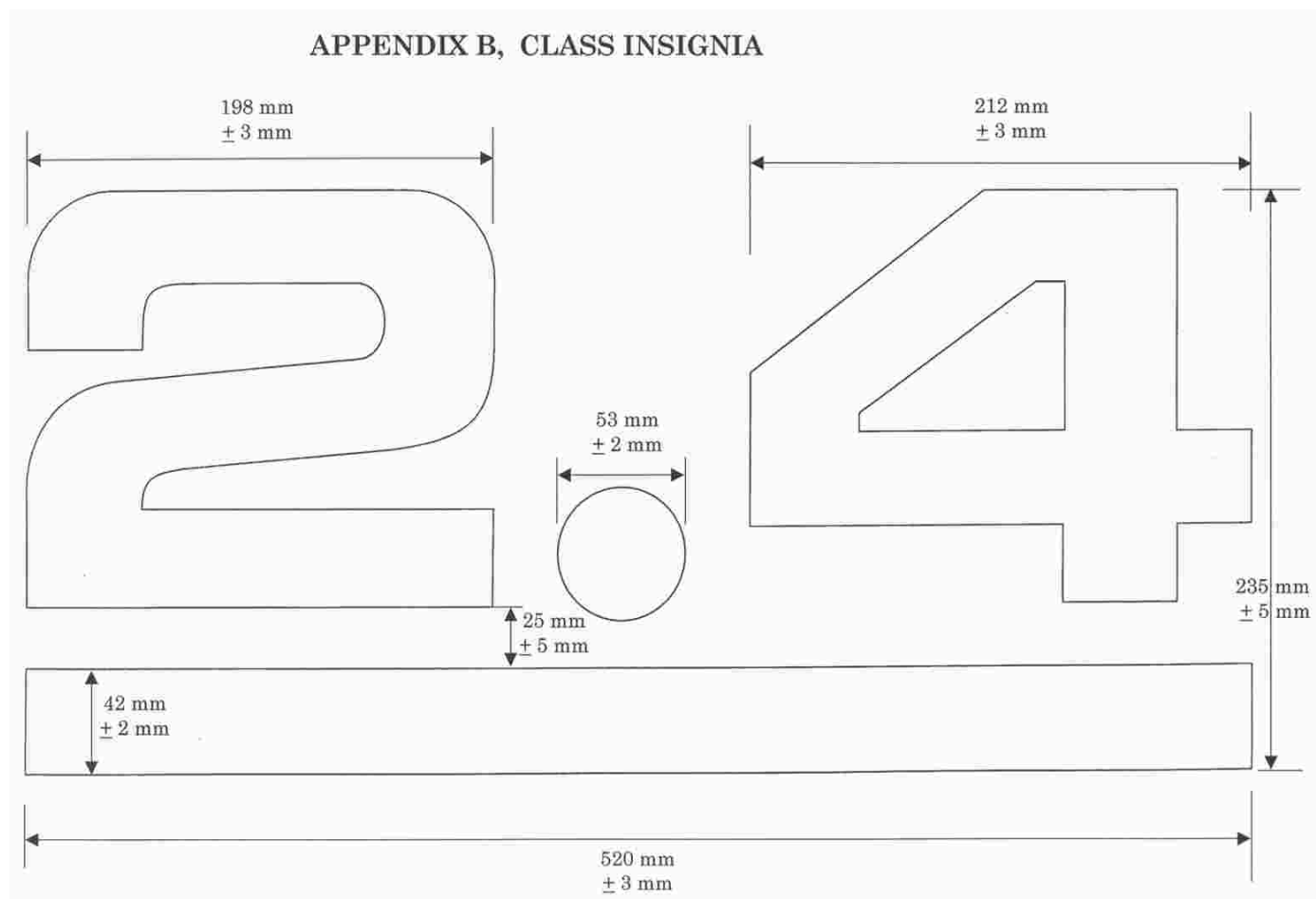
# H.4 MEASUREMENT DIAGRAMS



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

## Section J – Class Insignia

### J.1 CLASS INSIGNIA DIAGRAM



### J.2 MEASURERS OF INSIGNIA, NATIONAL LETTERS AND FIGURES

The National letters and distinguishing numbers shall be placed on the mainsail as laid down in the RRS. They shall be of the following minimum dimensions:

Height of insignia	220mm	Thickness of line	40mm
Width of insignia	520mm	Diameter of point	55mm
Width of figures	200mm	Space between line and figures	10mm
Thickness of figures	40mm		

### J.3 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

## Section K – Paralympic Class

### K. 1 SCOPE

The rules in this Section K shall apply to 2.4mR boats competing in events ruled by IFDS like the Paralympic Regatta, the World Championships for disabled sailors, individual country trials to such events etc. The rules are additional rules to those in Sections A – J, and shall be read in conjunction with them.

This Section K will only apply when it is referred to in Notice of Race and Sailing Instructions.

### K. 2 CERTIFICATE

In addition to B.1.1 the **boat** shall have a separate certificate according to the rules in this section K and according to a separate Measurement Form.

### K. 3 BOAT

#### K.3.1 WEIGHT

The weight in C.5.1 shall be minimum 259 kg and maximum 261 kg

#### K.3.2 BALLAST

The weight of the lead **ballast** in the keel including equipment specified below and placed in the keel whilst racing shall be maximum 182 kg. Equipment that is not included in the ballast weight is one electrical pump weighing not more than 0.400kg, one manual bilge pump made of plastic and hoses made of plastic.

#### K.3.3 CORRECTOR WEIGHTS

- (a) When the **boat** weight with ballast according to K.3.2 is less than required in K.3.1, the difference shall be placed as **corrector weights** of lead fastened to the hull according to K.3.3 (b). The weight and location of the **corrector weights** shall be recorded in the certificate.
- (b) All corrector weights shall be placed above the floor level and at least 50% of its weight shall be placed under the deck. The centre of gravity of these **corrector weights** shall be located not more than 200 mm from the 0.55xLWL station. The floor level is defined as a horizontal level 550mm below the **sheerline** at the 0.55xLWL station.
- (c) No equipment or installations are allowed to be made of lead or contain lead except for ballast according to K.3.2 and **corrector weights** according to K.3.3 (a) and (b).

### K. 4 HULL AND DECK

#### K.4.1 MOULDS

The hull and deck shall be built in moulds made according to the Norlin Mark III design and by builders licensed by the designer Peter Norlin or with his permission by the ICA. No changes, fairings etc are allowed on the outside of the hull and the deck except when needed for special equipment for disabled sailors e.g. peter boom.

## K. 5 ASSEMBLED HULL

### K.5.1 FITTINGS AND EQUIPMENT

The **foretriangle base J** in D.9.1 (a) (3) shall be 1560mm.

### K.5.2 DIMENSIONS

In order to check that the two halves of the hull shell and the deck are correctly assembled to each other the following measurements shall be controlled:

Beam of <b>hull</b> at <b>sheerline</b>	minimum	maximum
At a section 430mm from the stem head (L1 station)	244mm	254mm
At a section 2185mm from the stem head (0.55LWL)	801mm	809mm
At a section 3525mm from the stem head (L1 station)	533mm	543mm
Chain girth, at a section 2185mm from the stem head (0.55 LWL). Girth taken from the <b>sheerline</b> on one side round the keel and up to the <b>sheerline</b> on the other side	2740mm	2752mm

Clearance to templates at:	minimum	maximum
Stem at a section 430mm from the stem head (L1 station)		
Template placed perpendicular to the stem line	0	2mm
Underside of keel at a section 2185mm from stem head (0.55LWL)		
Template placed vertically	0	2mm
Fore side of keel 500mm above underside		
Template placed horizontally	0	2mm
Stern centreline 100mm in front of the rudder stock		
Template placed vertically	0	2mm

### K.5.3 KEEL TIP WEIGHT

maximum

The keel tip weight of the **boat** excluding **ballast**, equipment in the keel see K.3.2, **rig** and **sails**.

18kg

The tip weight shall be taken when the boat is hanging in the lifting straps fastened inside the boat and with the keel held in a horizontal position by supporting it on a point 50mm from the under side of the keel in the 0.55LWL section.

### K.5.4 CHECKING THE HULL AGAINST OTHER BOATS

Measurement to check the conformity of a boat to the Norlin MarkIII design can be carried through by comparing the boat against a randomly picked reference group of boats. If any measure on the boat being checked differs more than 3mm from the mean of the boats in the reference group, the checked boat shall be referred to the chief measurer who shall give the final ruling. This method shall be used only to check the outside shape of the hull and the keel excluding the deck. If any of the dimensions of the sample are considered to be unusual, all relevant information shall be reported by the ICA to the ISAF.

## K. 6 HULL APPENDAGES

### K.6.1 RUDDER

The shape of the rudder blade shall comply with the rudder template with the clearance minimum 0mm and maximum 5mm.

## K. 7 RIG

### K.7.1 BOOM

The **Outer point distance** in C.8.3 (a) shall be maximum 1960mm.

### K.7.2 STANDING RIGGING, DIMENSIONS

The fore triangle base in C.8.4. (a) shall be maximum 1560mm.

### K.7.3 MAST DIMENSIONS

Amendment to F.3.4

**Lower point to upper point** shall be maximum .....4650mm

### K.7.4 WHISKER POLE DIMENSIONS

Amendment to F.5.2

**Whisker pole length** shall be maximum .....2106mm

## K. 8 SAILS

### K.8.1 MAINSAIL DIMENSIONS

Amendment to G.3.4

	maximum
<b>Half width</b> .....	1333mm
<b>Three-quarter width</b> .....	804mm
<b>Upper width</b> .....	372mm

### K.8.2 DIMENSIONS OF HEADSAIL WITHOUT BATTENS

Amendment to G.4.4.

	maximum
<b>Foot length</b> .....	1716mm
<b>Three-quarter width</b> .....	437mm
<b>Half width</b> .....	827mm

### K.8.3 DIMENSIONS OF HEADSAIL WITH BATTENS

Amendment to G.4.5

	minimum	maximum
<b>Foot length</b> .....	...	1482mm
<b>Three-quarter width</b> .....	...	468mm
<b>Half width</b> .....	...	850mm