

INTERNATIONAL EIGHT METRE CLASS RATING RULE AND MEASUREMENT INSTRUCTIONS
Issued 1st March 2004

RATING RULE

1. RULE AND DURATION

At least one year's notice of any change to these rules shall be given and favourably seconded by a majority of the represented members.

Unless otherwise specifically stated a yacht shall comply with, and be rated in accordance with, the Rating Rule current when (the yacht was first measured, except that sails shall be measured in accordance with the current rule.

Replacements of spars or equipment shall comply with the Rating Rule current at the time the replacement is made.

A yacht which has had her displacement shape of the underwater part of her hull, position of the rudder post, or freeboard changed, as a result of reconstruction, shall be measured in respect of waterline length and freeboard, in accordance with the rules current at the time the alteration was made.

2. INTERNATIONAL FORMULA

$$8 \text{ m} = \frac{L + 2d - F + \sqrt{S}}{2.37}$$

Where:

- L = Length in metres
- d = Girth difference in metres
- F = Freeboard in metres
- S = Sail area in square metres

3. LENGTH (see Figs. 1 and 2 and Measurement Instruction 22)

The length "L" for the formula shall be the length measured at a height of 1.5 per cent of the class rating above the LWL (120mm) plus one and one-half times the difference between the chain girth at the bow section measured to points 5 per cent of the rating (400 mm) above "L" and twice the vertical height from "L" to those points, plus one-third of the difference between the chain girth, from sheerline to sheerline, at the stern ending of this length, and twice the vertical height at the side of the yacht at this station. For the purpose of calculating the rating the minimum difference of girth at the bow station, as defined above, shall be 3 per cent of the class rating (240 mm), the minimum difference of girth at the stern station, as defined above, shall be 10 per cent of the class rating (800mm).

The afterbody of the yacht shall be so shaped that an after chain girth measurement can be taken in a vertical transverse plane intersecting the after overhang at a height of 3 per cent of the class rating (240 mm) above the LWL (L2).

If one-third of the girth difference (i.e. the chain girth from sheerline to sheerline less twice the vertical height) at this station, L2, is less than 65 per cent of one-third of the stern girth difference at L1, the deficiency shall be added to the stern girth difference in calculating the yacht's rating. The horizontal distance from L1 to L2 shall not be less than 255 mm. The girth measurement at L2 shall be taken to the upper edge of the topsides at the girth station.

4. GIRTH DIFFERENCE (see Fig. 3 and Measurement Instruction 18)

The girth difference, d in the formula, shall be measured in the transverse plane, vertically, at 0.55 LWL from the fore end of the LWL (0.55 girth station) and shall be the sum of the differences between the skin girth and chain girth, measured on the two sides of the yacht, from the mark at the sheerline d , to corresponding points in the hull surface at a level 12.5 per cent of the class rating (1000 mm) below the waterline.

5. HOLLOW IN THE SURFACE OF THE HULL (see Measurement Instruction 20)

No hollows shall be allowed in the surface of the hull between the LWL and the sheerline, excepting in the profile of the stern forward of the point of measurement L1.

Hollows in the surface of the hull at the stern immediately resulting from the hollow allowed in the stern profile shall not be prohibited by this clause, provided any hollows so formed fall within the buttock line 306 mm from the fore and aft centreline and below measurement point L1.

6. DRAUGHT (see Measurement Instructions 4 and 5)

The maximum draught allowed shall be 16 per cent of the LWL plus 500 mm. If the draught exceeds that allowed, three times the excess shall be added to the rating.

The draught shall be taken as the vertical distance below the LWL plane to the lowest point of the hull, or movable appendage in any position. The draught shall be measured with the yacht level fore and aft and athwartships.

The beam of the hull, including any appendage, measured at any point below 1.200m below the LWL shall not exceed 2.440 m.

Centreboards or similar contrivances are prohibited.

7. FREEBOARD (see Measurement Instructions 25 and 31)

The freeboard F in the formula shall be one half of the sum of the freeboard at the 0.55 girth station and the freeboard at the bow L1 and the freeboard at the stern L1, minus 445mm. (Yachts laid down prior to the January 1st, 1984 shall be measured in accordance with the Rating Rule current when they were laid down). The maximum freeboard used as a minus quantity in the formula when calculating the rating shall be 890 mm.

When calculating the rating the freeboard aft shall not be taken as more than 0.825 of the freeboard forward.

The actual freeboard forward shall not be less than 1.20 times the freeboard amidships, but for calculating the rating shall not be taken as more than 1.50 times the freeboard amidships. (This requirement shall only apply to yachts laid down after 31st December 1984. Yachts laid down prior to that date shall comply with the rules current at the date the yacht's original certificate was issued).

(Before 1930 the freeboard F in the formula is to be the freeboard at girth station plus the freeboard at bow L ending plus the freeboard at stern L ending, the sum to be divided by three. The maximum freeboard used as a minus quantity in the formula when calculating the Rating shall be 0.08 multiplied by the Rating plus 0.25 metre.)

8. SHEER

The sheer of the yacht between the stern and L₁ station aft shall be a fair continuous concave curve.

9. TUMBLE HOME (see Measurement Instruction 17)

The tumble home on each side shall be not more than 2 per cent of the extreme beam. When the tumble home of the side of the yacht exceeds the amount allowed, three times the excess shall be added to the rating.

10. DISPLACEMENT

Displacement in cubic metres shall be not less than:

$$\text{Min. displacement} = [0.2 \text{ LWL (in metres)} + 0.15]^3.$$

If a yacht is less than the displacement required by the rule for her length on LWL then the difference between the length on LWL to which her actual displacement corresponds by the rule and the actual length on LWL shall be doubled and added to the length measurement.

To enable the displacement to be determined by weighing, yachts laid down after 31st December 1982 shall be provided with lifting eyes, the construction, size and attachment to the hull of which shall be approved by the appropriate classification society.

11. LIMITATION UPON MINIMUM BEAM

The minimum beam, measured at one-third of the Rule midship freeboard above LWL at the point of greatest beam on that line, shall be 2,440mm. Any deficiency shall be multiplied by 4 and added to "L" in the formula.

12. SAIL AREA (see Measurement Instruction 29)

The sail area, S in the formula, shall be measured as laid down in Measurement Instruction 29.

13. MAXIMUM HEIGHT OF SAIL PLAN

The maximum height, measured from a point 120mm above the sheerline abreast of the mast and along the mast, shall be the class rating multiplied by 2 plus 1 000 mm (17.000m).

14. MAINSAIL CROSS WIDTHS AND BATTENS

The total width of the mainsail, including the luff rope, at the half and three-quarter heights shall not exceed 68 per cent and 41 per cent of the permitted foot length B. These measurements shall be taken from the half and three-quarter points of the leech, to the nearest points on the forward edge of the luff. Hollows in the leech in way of the measurement points shall be bridged.

The length of the battens in all mainsails of yachts shall not be more than the following:

Top batten: Length unrestricted provided the batten does not extend beyond the leech.
Other battens: 2.000 mm

Maximum number of battens in sail: 4

The battens in a sail shall divide the leech into approximately equal parts.

Battens in other sails are prohibited.

15. MAXIMUM HEIGHT OF FORE-TRIANGLE AND LIMIT TO SIZE OF BALLOON JIBS

(see Measurement Instruction 29)

The maximum height of the fore-triangle measured from a point 120 mm above the sheerline shall be 75 per cent of the height of the sail plan permitted by Rule 13 (12.750 m). The clew of the biggest jib shall not extend, when first measured, more than 0.5 rating (4.000m), abaft the foreside of the mast, measured head to wind. No jib shall have a club or foot yard, more than one sheet or other device for extending it to other than a triangular shape.

16. LIMIT OF SIZE OF SPINNAKERS

The maximum dimensions of a spinnaker shall not be more than the following:

Maximum length of luff and leech of spinnaker:

80 per cent of the square root of "I" squared plus "J" squared, plus 2,500mm
"I" is the height of the fore-triangle.
"J" is the base of the fore-triangle.

Expressed otherwise:

$$0.8 \times \sqrt{I^2 + J^2} + 2500 \text{ mm} = \text{max length of luff and leech}$$

Maximum length of foot of spinnakers shall be 250 per cent of "J".

The sail shall be symmetrical about a line joining the head to the centre of the foot. The mid-girth shall not be less than 75 per cent of the length of the foot. The mid-girth shall be taken as the distance between the midpoints of the luff and leech measured in the shortest path on the surface of the sail. The length of the foot shall be measured around the foot of the sail.

Intentional openings in the sail, in addition to the normal cringles and reefing eyelets, shall be permitted provided that the sail is substantially flat in the vicinity of the openings.

The luffs and leeches of spinnakers shall be taped with stretch resistant tape.

All spinnakers shall have the luff and leech of equal length.

17. HEADBOARDS

The distance between the aftermost point of the headboard of the mainsail and aft side of the mast measured perpendicular to it shall not exceed 200 mm. If there is a groove in the aft side of the mast the measurement shall be taken to the forward side of the groove.

Headboards are prohibited in all other sails.

18. MEASUREMENTS

All measurements shall be taken without crew on board.

19. MARKS

Visible marks on the hull shall be in accordance with Measurement Instructions 12, 13, 14 and 15 of the "Instructions to Measurers".

20. IMMERSION (see Measurement Instruction 28)

The certified rating shall be for the immersion of the yacht in water of the specific gravity of 1.025 (sea water). Allowance shall be made in the case of vessels measured in fresh water, as prescribed in the Measurement Instructions.

The top of the triangular side marks shall not be immersed when the yacht is on a level keel in racing trim with all persons and additional equipment not specified for purposes of measurement on board. Re-checking of this requirement may be requested at any time.

21. DECK REQUIREMENTS

Decks shall not have 'negative camber'. That is at any transverse section through the yacht, the top of the deck shall not lie below a straight line drawn from the top of the deck at one side of the yacht to the top of the deck at the other side.

This requirement shall not be applied to prohibit small recesses used to accommodate particular and individual items of gear or equipment, such as spinnaker booms, provided that the method of construction is approved by Lloyd's Register as retaining not less than the weight of the deck structure replaced by the recess. The maximum camber of the deck must not exceed 1/20 of the greatest beam of the yacht.

Deck Openings

- a. The total area of deck openings shall be not more than 3.5m². No opening shall be closer to sheerline than 200mm.
- b. A hatch between the mast and forestay shall not be included in the total area of the deck openings, provided that:
 - i. The method of construction is approved by Lloyd's Register.
 - ii. The area does not exceed 0.4m².
 - iii. It is not closer than 500 mm to the sheer

- iv. The hatch shall have a cover, the weight of which shall be not less than the weight of the deck it replaces. It shall be securely attached to the deck and shall be in place while racing except when the spinnaker is being set or retrieved.
- v. The sliding hatch on the cabin top over the entrance to the cabin from the cockpit does count as part of the area of deck opening.
- vi. An after hatch being a separate hole in the deck abaft the cockpit shall be included in the total area of deck openings.
- vii. Small holes for the sole purpose of the entry of running rigging and trimming lines are permitted. Maximum area for each opening 25 cm².

22. SCHEDULE OF EQUIPMENT

(a). The following portable or semi-portable items shall be onboard and in normal position of use when the yacht is measured afloat:

- i. Mainsail, genoa jib and spinnaker
- ii. Spars and standing rigging, including one spinnaker boom
- iii. Anchors, chains and warps: one anchor not less than 16 kg, 40 m cable of 15 mm diameter.
- iv. All winches normally used, including complete drive units, pedestals and cranks, together with no fewer than two handles for deck capstans or geared winches.
- v. Sheaves or turning blocks for genoa and spinnaker sheets, or snatch blocks if these are used in place of turning blocks.
- vi. Floorboards as normally used.
- vii. Electronic equipment or other equipment used to record or analyse performance.
- viii. One fixed pump or one portable handpump, including overboard discharge.

(b) The following items may be removed from the yacht when measured afloat:

- i. Running rigging, including halyards, sheets, guys and tackles.
- ii. Lifebelts or similar lifesaving equipment.
- iii. Extras and spares.
- iv. Tools and miscellaneous portable items not otherwise required to be on board.
- v. The crew cots, all mattresses and bedding.

NOTES

Equipment - All items in the above Schedule shall be bona fide of the nature common to the usual fittings of a yacht. Unspecified equipment carried when racing shall not be of the nature of ballast or merely carried for the purpose of stiffening the yacht. Consumable stores carried when racing shall not exceed 60kg, including liquids.

No unspecified equipment shall be stowed below cabin floor except batteries not exceeding 45kg in weight, but light articles not specified may be stowed below the cabin floor, if the specific gravity of such articles does not exceed that of salt water.

Free flooding compartments are prohibited.

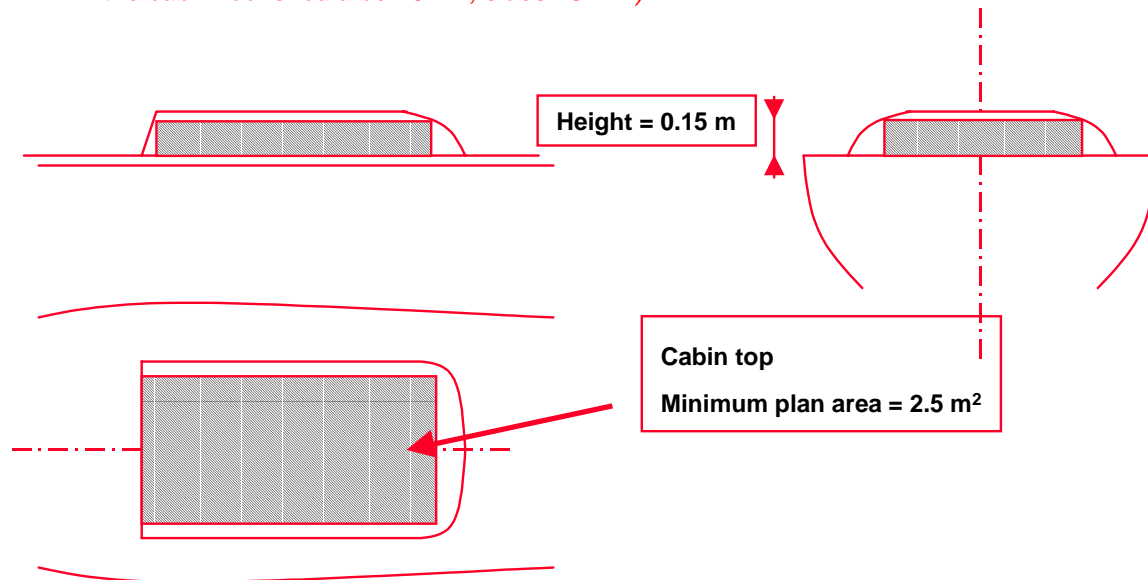
The materials used for the ballast keel and fixed inside ballast shall be no heavier than lead.

(For the position of anchors and chains and gear during measurement see Measurement Instruction 28 - "Afloat Test").

Special notes for yachts of the 8m Rating Class

- (i) All the yachts must be fitted below decks with ordinary fittings of a yacht, efficiently constructed, including: two sleeping berths in the cabin and one sleeping place for the crew. As sleeping berths are to be understood, securely fitted bedstands, or sleeping sofas, the dimensions of which are at least 1800 x 450 mm. As sleeping places, frames made of tubing covered with sail cloth, hammocks and other similar appliances may be adopted.
- (ii) The minimum height of cabin is 1.100 mm, measured from the floorline to the underside of the deck, regardless of deck beams. This 'height of cabin' is to be maintained over a distance of at least 1/5th the length of the yacht on the line of flotation. The increased heights under companions, or other deck erections are not to be taken into account in measuring the 'height of cabin'.

- (iii) Minimum breadth of floor measured to the inside of the vessel's skin, at the level of the floor line for the purpose of measurements shall be 500 mm at the widest point.
- (iv) A cabin top shall be fitted. The average height of the cabin top, measured to the outside, shall not be less than 0.15 m over a minimum area of 2.2m². The mast shall not go through the cabin top, the carlings or beams shall not go across the space. The scantlings for the cabin top shall be the same as the adjacent deck. A skylight is optional, but a hatch forward of the mast shall be fitted.
(Any yachts ordered before February 1927 do not need to have a cabin, but a skylight. Thickness of the cabin roof should be 15mm, sides 25 mm)



- (v) At least two bulkheads shall be fitted. Wooden bulkheads must be at least 15mm thick. One must be at the fore end of the cockpit, the other near the mast. The maximum permitted opening allowed in the bulkheads is 1.0 m². The aft bulkhead shall be fitted with doors or hatchboards.

23. MAST (see Measurement Instruction 29)

The mast shall be constructed of wood or aluminium alloy. The use of other materials is prohibited.

The mast shall comply with the following dimensions:

	Section area (min) cm ²
At upper measurement band	63.6
At jib halyards	163.0
At half height to jib halyards	254.5
At deck	229.7

Between the measurement points the profile of the mast shall have a fair rounding taper. The ratio between fore-and-aft and athwartships measurements of the mast section shall nowhere be greater than 1.6 to 1.

A luff groove or track, not exceeding 30 mm fore and aft may be added, but the area corresponding to this addition shall not be counted in computing section area.

A mast of constant cross-section from the deck to 65% of the height of the sailplan may have a section area of not less than 227 cm². Above this point the mast may be tapered, to a minimum section area at the upper measurement band of 63 cm². No part of the mast surface shall be concave.

The weight of the mast, including all fittings (including the heel plug if any), but excluding standing and running rigging, shall be not less than 145 kg. The centre of gravity of the mast shall be not less than 6.460 m (0.38 of the rule height of the mast above a point 120 mm above the sheer line)

Corrector weights may be inserted in the mast to bring it up to the minimum permitted weight or to correct the position of the centre of gravity.

No devices shall be fitted or employed to move the athwartships position of the mast at its heel or at the deck. The clearance on each side of the mast at the mast partners shall not exceed 20mm.

Permanently bent masts, rotating masts, double luffed sails, and similar contrivances are prohibited. For the purpose of this rule a permanent set not exceeding 150 mm between the upper and lower measurement bands is permitted.

24. BOOM

The main boom shall be constructed of wood or aluminium alloy. The use of other materials is prohibited. There are no restrictions to the materials used for the construction of spinnaker poles.

The boom including sail track, but excluding other fittings, shall not exceed 210 mm in depth. The depth of the boom at any point shall not exceed twice the width.

A boom shall not be made permanently concave in a fore and aft direction. Permanently or mechanically bent booms and struts and outriggers on booms shall be prohibited. A boom which bends either vertically or horizontally shall be permitted unless the bend is accentuated or induced by a force physically applied for the purpose of bending it. Vangs if used shall not exceed two in number, one of which may be a fore guy. (Note: the purpose of (a) the mainsheet, is to trim the boom, (b) vangs and guys, is to hold the boom down and/or forward). A jackstay or rail, if used, shall be fixed in the fore and aft line of the boom. For the purpose of this rule a permanent set not exceeding 50 mm is permitted.

The height of the top of the coloured band on the mast marking the lowest position of the boom for the measurement of sail area measured from a point 120mm above the sheer line shall not be less than 600 mm and not more than 1250 mm.

25. CREW

The maximum number of persons on board during a race shall be 6. The above is for international racing, each National Authority may make its own rules for local racing.

26. SCANTLINGS AND CLASSIFICATION

To denote that their scantlings are as required for their rating, all yachts shall be classed 'R' by one of the following classification societies: Lloyd's Register of Shipping, London, England (from whom the tables of scantlings may be obtained); Bureau Veritas, Paris, France; Norske Veritas, Norway; Germanische Lloyd, Hamburg, Germany; Registro Italiano Navale, Genoa, Italy; Nippon Xaiji Kyokai, Tokyo, Japan; American Bureau of Shipping, New York, USA. In individual cases, the use of recognised classification societies, other than listed under this rule, may be used subject to written approval of the International Eight Metre Association and the International Sailing Federation.

The guiding factor for the approval of the alternative materials in the future will be that they give equivalent weight and weight distribution to the Rules and Regulations for the construction and classification of yachts of the international rating classes as issued by Lloyd's Register of Shipping in 1957.

27. CERTIFICATE OF RATING (see Measurement Instruction 30)

As soon as a yacht has been measured, the measurer shall forward the measurements (with the sailmaker's diagram if necessary) to the National Authority, which shall in due course, and after receipt of the classification society's certificate, issue a Certificate of Rating which shall be in force from the date of the completion of the measurement.

If from any peculiarity in the build of the yacht, or other cause, the measurer shall be of the opinion that the rule will not rate the yacht fairly, or that in any respect she does not comply with the requirements of these rules he shall report the circumstances to the National Authority who shall refer the matter to the International Sailing Federation, which, after due inquiry, shall award such Certificate of Rating as they may consider equitable, and the measurement shall be deemed incomplete until this has been done.

28. ERRORS IN CERTIFICATE

Should the certificate under which the yacht has sailed in any race or races be proved to have been incorrect for any reason, the National Authority may, after inquiry, correct such certificate as it may deem proper, and may revise claims of the yacht to the prizes which she may have been awarded in such race or races.

29. OBLIGATIONS OF OWNER RESPECTING CERTIFICATE

The certificate of rating shall cease to be valid under any of the following contingencies:

- (a) If the displacement is reduced or the draught is increased or any dimension altered so as to invalidate the certificate.
- (b) If any dimensions measured for rating, except freeboard, is found to exceed the measurement stated on the certificate.
- (c) If one or both of the length marks fall within the length immersed when the yacht is lying in smooth water in measurement trim.
- (d) If any alteration is made so as to increase the beam or girth difference, or the length of any spar or spars, as respectively measured for rating, or if the sail plan is altered.
- (e) If any length or girth or immersion mark is moved from its position.
- (f) At the expiration of four years from the date of the certificate. In such case the owner or his representative shall forthwith notify in writing the invalidity of the certificate to the National Authority. A fresh re-dated certificate shall afterwards be issued, to be in force from the completion of remeasurement, and appropriate classification surveys, or from the date the certificate expires under clause (f)
It is especially incumbent on the owner, or his representative, to ascertain from time to time, by inspection of the marks, whether the immersion of the yacht has from any cause whatever become such as to render the certificate invalid.
- (g) If alternations are made which invalidate the current certificate of classification, unless the relevant classification society is able to confirm that as a result of a subsequent survey carried out, a new and valid certificate of classification has been issued or is in issue.
An owner's declaration, duly signed, shall be required for international competition. Such declaration shall indicate that no changes have been undertaken which would invalidate the yacht's latest certificate of classification.

30. PENALTY FOR INFRINGEMENTS OF PROVISIONS RELATING TO CERTIFICATE

If an infringement of any of the foregoing provisions in respect of the validity of the certificate of a yacht should, in the opinion of the National Authority, be proved against any yacht, such yacht shall be liable to be disqualified by the National Authority from starting in any race sailed under these rules for the remainder of the current year, or such period as the National Authority may direct, reckoning from the date at which her certificate shall be proved to have become invalid.

31. INSPECTION TO BE PERMITTED BY OWNER

Every owner sailing under these rules shall permit all reasonable inspection by or on behalf of the National Authority and shall afford all reasonable facility to carry out such inspection in regard to measurements, marks, fittings, and such other matters as fall within the scope of a measurer's duty.

32. WEIGHING THE YACHTS

Before a yacht is granted her first certificate of rating she shall be weighed. (This shall apply only to yachts laid down after December 31st 1982). The weight found shall be shown on the Certificate of Rating. The weight of all loose ballast and its position shall also be noted on the Certificate of Rating.

If a re-measurement is required owing to an alteration of the keel, the yacht shall be re-weighed, but if a re-measurement is required, owing to an alteration of the loose ballast, or for other reasons, it is not necessary to re-weight the yacht, but such alterations shall be noted on the certificate.

33. RARE AND EXPENSIVE MATERIALS

Equipment, fittings, spars and rigging excluding sails, shall be made of materials, which are readily available. Scarce metals such as tungsten, beryllium and titanium, except as alloyed increments, are prohibited unless they are standard equipment in stock items offered by manufacturers to the public. Similarly, composite materials, which include fibres such as boron, are prohibited. The above shall apply to structural items not covered by the scantling requirements.

The intention of this rule is the elimination of the use of unusual materials of excessive cost. The above shall also apply to structural items not covered by the Scantling Requirements.

34. INTERNATIONAL CLASS FEE

An International Class Fee shall be paid in respect of each yacht built. The fee shall be paid to the ISAF who shall issue in return an ICF plaque, which shall be affixed to the aft face of the starboard cabin top. A National Authority or IEMA National authority only shall not issue a Measurement Certificate to a boat, which does not have an ISAF ICF Plaque. Boats first certificated before 1st January 1986 are exempted from requiring a plaque.

35. CLASS EMBLEM, NATIONAL LETTER(S) AND DISTINGUISHING NUMBERS

The class emblem, national letter(s) and distinguishing numbers shall be placed as laid down in ISAF Yacht Racing Rule 25 and Appendix B3. They shall be of the following minimum dimensions:

Height	500 mm
Width	330 mm (except number 1 and letter i)
Thickness	65 mm min, 80 mm max.
Space between adjoining letters and numbers	90 mm

36. ADVERTISING

A National Authority may permit limited advertising in accordance with the relevant ISAF Rule.

37. ELECTRONIC INSTRUMENTS

Electronic positioning systems including but not limited to the Global Positioning System (GPS) are permitted. Displaying the data from the positioning system in the same device with other data is permitted. Any other interfacing, exchanging or processing of data from the positioning system with data from other Electronic devices is not permitted. Any kind of radar or other distance measuring devices alike are not permitted.

MEASUREMENT INSTRUCTIONS

1. TRANSLATIONS

Each National Authority may issue a translation of these instructions for the use of the measurers.

2. MEASURERS

Measurers of any National Authority shall not measure:

- (a) yachts which they have themselves designed or built or in the construction or alteration of which they have in any respect taken part;
- (b) yachts which have been built by firms in which they have a business interest;
- (c) yachts of which they are themselves the owners or part owners.

If necessary, in such cases a special measurer shall be appointed for the purpose by the National Authority.

3. EXTRA MEASUREMENTS FORBIDDEN

The measurers shall be prohibited from taking measurements other than those necessary for determining the rating, except as may be expressly enjoined by the National Authority.

4. DEFINITION OF SHEERLINE

The sheerline is defined as the intersection of the fair continuous extension of the side of the hull and of the deck. However, if the radius between the side of the hull and of the deck is in excess of 20 mm the sheerline shall be taken as the maximum limit of tumble home permitted in Rule 9.

5. CHECKING DISPLACEMENT

Should the National Authority or International Jury for a regatta series consider it necessary for any reason to check the weight of a yacht, they may depute the official measurer or a sub-committee to re-weigh the yacht.

6. SCHEDULE OF EQUIPMENT

The measurer, before certifying the measurements as complete (see Measurement Instruction 8), shall satisfy himself that the yacht conforms to the Rating Rule.

7. DOUBTFUL CASES

If from any peculiarity of build, construction, or fitting of any yacht, the National Authority, on the report of the measurer, is in doubt as to the application of the rules or instructions, or the calculation of the rating, it shall report the case to the ISAF, who after due enquiry shall award such certificate of rating as it may deem equitable; and the measurement shall be deemed incomplete (see Measurement Instruction 8) until this has been done.

8. CERTIFICATE OF RATING

Immediately the measurements are complete, the measurer shall forward the same to the National Authority and shall hand to the owner or his representative an intimation in the following form:

I beg to inform you that the measurement (or re-measurement) of the yacht is complete. The certificate, stating the rating of the yacht, shall follow in due course.

Signed:

this day of:

Official Measurer:

9. MEASUREMENTS AND CALCULATIONS

Metres - all decimals beyond the third place shall be disregarded.

At the time of measurement, ashore and afloat, backstays, runners and forestays shall be slack.

10. MEASURING INSTRUMENTS

All measurements shall be taken with a steel tape or with rods (or an ordinary measuring rule may be used in case of measurements of less than one metre); and all such Instruments shall be approved by the National Authority.

11. MEASUREMENT BOOKS

The measurement certificate form, as shown in Measurement Instruction 31, shall be used by IEMA in issuing measurement certificates in accordance with the class rules. All measurements shall be taken twice and a third time if there is a material disagreement.

PLACING THE MARKS IN POSITION ON THE HULL

12. MARKS SHALL BE OF STANDARD PATTERN

The measurement marks shall be of the size given in Measurement Instruction 14 and shall be of durable plastic or metal compatible with the hull material and shall be permanently fixed to the hull. The several marks shall be referred to in these instructions by the letters by which they are denoted in the enumeration below.

13. VERIFICATION OF MARKS

The marks shall be affixed at the expense of the owner and their positions verified by the measurer.

14. ENUMERATION OF MARKS

The requisite marks shall be as follows:

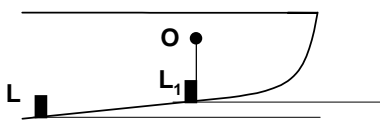
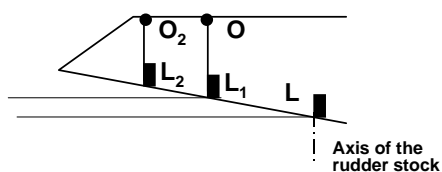
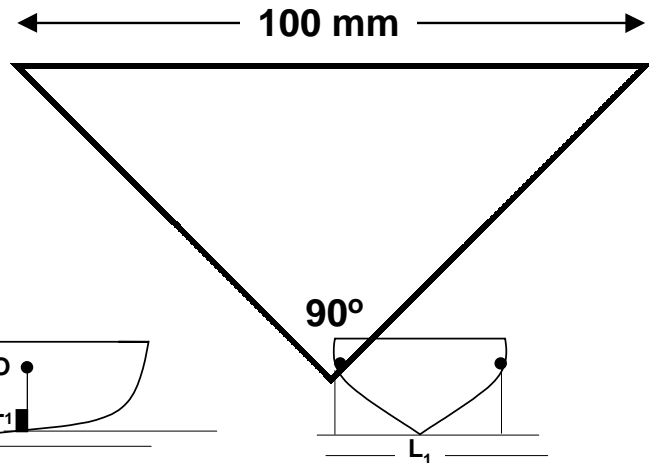
NUMBER REQUIRED	DESCRIPTION	POSITION
2	Upper length marks, L1	Ends of measured length
2	Lower length marks, L	Ends of LWL
2	Upper d marks, d	Covering board at 0.55 girth station
2	Immersion marks, I	LWL at 0.55 girth station
2	Lower d marks, d1	Sides of vessel below water amidships
4	Overhang girth marks, O	Ends of measured length, see Measurement Instruction 15
1	Outer after length mark, L2	As prescribed in Rule 3
2	Outer overhang girth marks, O2	Vertically above the outer, after length mark, L2

The length marks, L, L1 and L2, shall be rectangular marks not less than 12mm in width and 150 mm in length.

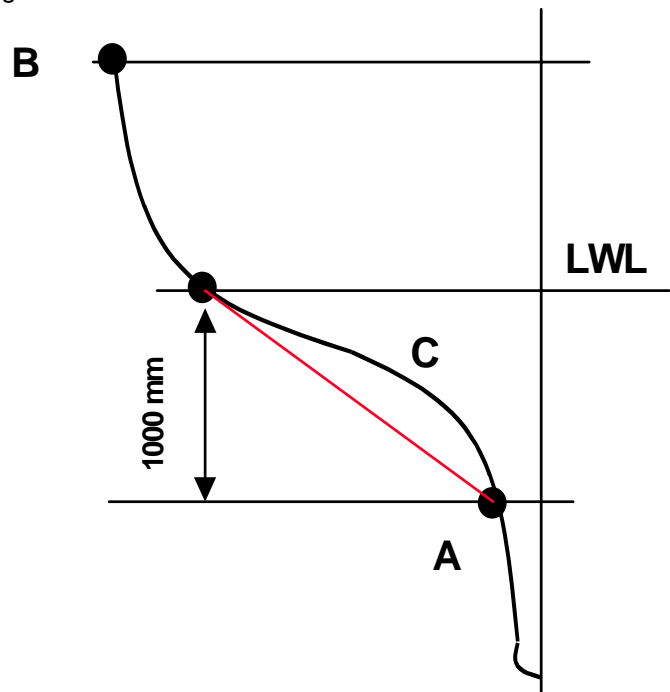
The d and overhang marks, d, d1, O and O2, shall be round marks of 20mm diameter. The immersion mark I shall be a triangular mark, thus:

15. DESCRIPTION OF MARKS AND FIXING THEM ON YACHT

Before the official measurer measures a yacht the marks enumerated in Measurement Instruction 14 shall be provisionally placed in position as nearly as possible by the owner's representative (i.e. the designer or builder) as follows:



- (a) The waterline marks, L, at the ends of the waterline. In transverse plane, at a right angle to the waterline, so that the outer edges of the marks denote the waterline ending (see figures 1 and 2 and instruction 20) and as close to the centreline of the vessel as possible.
- (b) The upper length marks, L1, on the fore part of the stem and the upper length marks L1, and L2, on the after part of the counter. In a transverse plane at a right angle to the centreline (see figures 1 and 2) and as close to the centreline of the vessel as possible. They shall be fixed so that their outer edges shall be at the height above the waterline as follows:
- Vertical height of mark L1 above LWL shall be 120mm.
 - Vertical height of mark L2 above LWL shall be 240mm.
- (c) Overhang girth marks O at bow shall be fixed so that their centres shall be vertically above the outer edges of the L1 marks, and at the following height above the L1 marks:
- Vertical height of bow O mark above L1 shall be 400mm.
- (c) Overhang girth marks O and outer overhang girth marks O2 at stern on the edge of or close below the sheerline, one on each side of the yacht, centres vertically above the outer edges of the L1 and L2 marks respectively (see figures 1 and 2).
- (d) Upper d marks d on the edge of or close below the sheerline, one on each side of the yacht at a girth station 0.55 LWL from the fore end of the LWL.
- (e) Immersion marks I on both sides of the yacht shall be plumb under the marks d and the bottom corners just touching the waterline. (See Measurement Instruction 14).
- (f) Lower d marks d1, one on each side of the yacht at a point plumb under the centre of the centres of the marks d and I, so that the three marks shall be situated in the same transverse plane and shall be vertical to the LWL. The marks d1 shall be fixed at a vertical distance of 1 000mm below the LWL.



MEASUREMENTS TO BE TAKEN ASHORE

16. OVERALL LENGTH

The overall length shall be measured along a level line above the deck, from the plumb of the foremost point of the hull to that of the aftermost point, exclusive of rudder, should there be any doubt as to the precise point to which the measurement should be taken, the point actually taken for measurement shall be clearly described in the measurement book.

17. BEAM

For measuring the extreme beam, a plumb-line shall be suspended on each side of the yacht from a transverse batten, so that both hang just clear of the side when the yacht is upright, and the distance shall be measured between the lines at the position defined in Rule 11. The lines shall hang clear of any protrusions. The measurement shall be tried in several places, and, finally taken where found greatest.

The beam on deck shall also be measured to ascertain that the tumble home does not exceed the 2 per cent allowed by the rule.

18. MEASUREMENTS FOR 'd'

Port Side

- a. Measure from the upper side of the sheerline through the centre of the upper d mark d downwards on the skin surface of the yacht to the centre of the lower d mark d1.

- b. Take a measurement between the same points with the tape pulled taut.

Starboard Side

Take similar measurements (1) and (2) on the starboard side.

19. OVERHANG GIRTHS

The overhang girth at each end shall be the shortest chain girth; forward from the centre of the 0 mark on one side, to a point on the fore and aft profile line where it is cut by the vertical plane, through the outer edges of the upper length marks, L1, and from this point to the 0 mark on the other side. The aft measurements shall be made in a similar manner, but from the sheerline to sheerline through the centres of the 0 marks, which are on the edges of the sheerline. The measurement to the L2 and O2 marks shall be taken in a similar manner.

20. PROJECTIONS, NOTCHES, HOLLOWES AND DIAMETER OF RUDDER POST

The measurer shall see that the yacht conforms to Rule 5 and shall, if necessary, test the surface of the hull between the LWL and the sheerline with a straightedge, with the exception of the hollows in the stern permitted by Rule 5.

When the length of the yacht including the rudder at or below the watering plane exceeds the length between the girth stations (i.e. (the measured length), then this difference shall be added to the waterline length for computing the displacement and draft. The after "L" mark shall be placed on the after end of the waterline plane as prescribed in Measurement Instruction 22.

The rudder post, or main piece of rudder, measured athwartships shall not exceed 125mm when the rudder extends beyond the aft end of the waterline.

Should there be any irregular hollows or notches in the stem, stern post or stern of the yacht within a vertical distance of 100 mm above or below the flotation waterline (Measurement Instruction 24 paragraph (i)) they shall be bridged across within the limits of the said vertical distance except that, hollows aft below the flotation waterline or above as permitted by Class Rule 5 shall not be subject to such bridging.

Such notches or hollows shall not affect the placing of the length marks, L, L1 and L2 or the overhang marks 0 and O₂. However, to the extent that bridging increases the length for measurement or the waterline length, the increased length shall be used for the purpose of rating and displacement.

21. YACHTS OF PECULIAR CONSTRUCTION

If from any form of construction the marks 0 and O2 cannot be placed at the sheer line in a vertical fine above the L1 and L2 marks respectively, they shall be placed as near thereto as possible and the overhang girth shall be measured at the points indicated by the marks as placed.

If for any reason there is placed any contrivance at the stem or stern in order to avoid the measuring of the overhang, such contrivances shall be disregarded in measuring the overhang girth.

22. WATERLINE LENGTH

The length to be recorded as the waterline length shall be the overall length as in Measurement Instruction 16, minus the sum of the overhang deductions at the two ends as specified in Measurement Instruction 24(i).

The waterline length shall only be required by the measurer for the purpose of verifying the LWL used by the designer in his calculations for his declaration for displacement.

The aftermost ending of the LWL shall be taken as whichever of the following gives the greater measurement:

- a. When the centreline of the rudder stock is at the aft end of the waterline and the hull below the waterline (including any skeg for the rudder) extends aft of this point, for displacement calculations the aft end of the LWL shall be taken as being the aft most point of the hull below the waterline.

- b. If the displacement of a yacht is changed so that she floats to new 'L' marks the waterline length shall be measured as for a new yacht. The displacement shall also comply with the requirements for a new yacht.

23. MEASURED LENGTH

The length to be recorded as the measured length shall be the overall length as specified in Measurement Instruction 16, minus the sum of the overhang deductions at the two ends as specified in Measurement Instruction 24(i).

24. OVERHANG DEDUCTIONS

a. **Deductions for waterline length**

The overhang length deductions shall be measured in a fore and aft direction, from the plumb-lines to the respective ends of the overall length, as just specified, to the edges furthest from midship of the respective marks L.

b. **Deductions for measured length**

The overhang deductions shall be measured from the same plumb lines, as specified above, to the edges furthest from midship of the respective marks L1 and L2. If the marks L1 and L2 are wrongly placed, the measurer shall order them to be shifted into correct position. Should it be necessary to shift the marks L1 and L2 to get them the proper height above the water level, the 0 and 0₂ marks shall be shifted so as to be plumb above the L1 and L2 marks.

25. FREEBOARD

The freeboard shall be the vertical distance from the water level to the sheerline through the centres of marks O, d and O forward, amidships, and aft on both sides of the yacht.

Freeboard shall also be taken at O₂ in a similar manner in order to determine the vertical heights required in Measurement Instruction 26.

26. VERTICAL HEIGHTS

The vertical heights at bow and stern to be deducted from the girths at these stations shall be found as follows:

Bow The amount of the vertical height deductions always equals 10 per cent of the class rating (800 mm).

Stern From the mean freeboard at stern 0 and 0₂, subtract the height above water of the mark L1 and L2 (see Measurement Instruction 15).

27. WEIGHT

The measurer shall ascertain the yacht's weight by weighing as directed by the National Authority.

MEASUREMENTS TO BE TAKEN AFLOAT

28. AFLOAT TEST

The measurer having verified the correct position of all marks and taken all measurements ashore, shall only be required to test the position of the marks by sighting when the vessel is put afloat. The measurer shall test that the length marks "L" do not fall within the length immersed and to observe that the lower corners of the "I" marks just touch the water. When the measurer tests the position of marks or, if necessary, takes measurements afloat, the yacht shall be lying in smooth and still salt water (specific gravity 1.025) and she shall have on board the equipment named in Rule 22.

During the afloat test the anchors and warps shall be placed approximately amidships. The mainsail shall be either stowed in the usual way on the boom, or if unbent shall be approximately amidships. The items named in Rule 22 shall be in their usual positions during the measurer's afloat test.

For the afloat measurement the aft side of the mast at the upper measurement band shall be vertically above the mast at deck level.

The measurer shall check that when the yacht is on a level keel in racing trim with all persons, sails, etc., onboard she shall satisfy the requirements of Rule 20. Re-checking of this may be requested at any time.

Measurements of Yachts in fresh water

The certificate of measurement of a yacht measured in fresh water shall be valid in fresh water only, and shall not exempt this yacht from another measurement in salt water when she is going to race at sea.

A certificate of measurement of a yacht measured in salt water shall be valid in fresh water. However while is in fresh water, a club or a competitor may ask for the verification of her measurement, to make sure that the allowance for fresh water is not exceeded.

In the event of it being necessary to measure a yacht in fresh water, the measurer shall require the designer or builder to furnish him with a certificate showing the difference in the immersed length and freeboard in sea water of a specific gravity of 1.025 and fresh water of a specific gravity of 1.000, and the rating shall be calculated with an allowance according thereto, in the manner prescribed by the National Authority with the concurrence of the ISAF.

The measurement marks shall be fixed for the immersion in salt water with additional L and I marks for the immersion in fresh water.

The measurer shall measure the distance between the fresh water and salt water length marks, so placed, and see that it agrees with the difference named on the certificate furnished to him by the designer or builder.

The Certificate of Rating of a yacht so measured shall be endorsed Fresh Water Certificate.

MEASUREMENT OF SAIL AREA (for Bermudan sloops and cutters only)

29. SAIL AREA

S= Rated area of triangular mainsail(s) and Rated area of fore-triangle

Area of triangular mainsails

Luff A. Measured from top of boom, where in its lowest position it cuts the mast, to the top of the sheave, or coloured band at the after side of the mast. The lowest position of the boom shall be indicated by a coloured band on the mast, the top of which shall be in a line with the top of the boom and a permanent stop shall be fitted in conjunction with this band. No part of the headboard shall exceed in height the top of the sheave in first case and the lower edge of the band in the second case.

Boom B. Measured from the inner edge of the coloured band at boom end along the top of boom to the after side of the mast excluding the track or jackstay; but if there is a groove in the mast for the sail, to the foreside of the groove:

$$\text{Rated area of mainsail} = \frac{A \times B}{2}$$

Area of fore-triangle and limit of headsails

I. Where the foremost headsail is set on a stay the height I shall be measured from a point 120mm above the sheerline at the foreside of the mast to where the aftside of this stay cuts the foreside of the mast or topmast.

Where the foremost headsail is set on a headfoil into which the luff of the sail is fitted, the measurements of I and J shall be taken to the forward edge of the headfoil or its extensions to the mast and deck as necessary.

Where the foremost headsail is set flying or without attachment to the forestay the height I shall be measured to where the line of the luff when extended cuts the foreside of mast or topmast. If the point of attachment of any contrivance suspending the head of the spinnaker is above the top of the normal fore-triangle, the measurement of I shall be taken to that point.

J. The base J shall be measured from the foreside of the mast to where the aft side of the forestay to which the foremost headsail is attached cuts the bowsprit, other spar or hull, etc., as the case may be. Where the foremost headsail is set without attachment to the forestay the base J shall be measured to where the line of the luff when extended cuts the bowsprit, other spar or hull etc.

$$\text{Rated area of fore-triangle} = 0.85 \times \frac{I \times J}{2}$$

Sails - General

Sails shall be measured in accordance with the ISAF Sail Measurement Instructions, where applicable except that non-woven and multi-ply sails are permitted. The measurer shall check that the foot of the largest Genoa shall not extend more than 0.5 of the rating abaft the mast when first measured.

Reinforcement of a sail may be of any size provided that it is flexible and capable of being folded without damaging the sail or its reinforcement.

Spinnaker Boom

In all cases if the length of the spinnaker boom exceeds the normal length of the base the excess shall be added to the base J. The spinnaker boom shall be measured from the centre of fore-side of mast to the outer end of the boom or end fitting with boom shipped in its place and in any position from fore and aft to square off where the projection is greatest.

In the case of a yacht having no headsail but carrying a spinnaker, the area for headsail shall be computed from the length of spinnaker boom, and the height from deck to where the line of the halyard of the spinnaker when extended cuts the mast.

A spinnaker shall not have more than one sheet or any other contrivance for extending the sail to other than a triangular shape.

FINDING A RATING

30. RATING FORMULA

$$8 \text{ m} = \frac{L + 2d - F + \sqrt{S}}{2.37}$$

The measurer having taken, or been supplied with, all the measurements enumerated in these instructions, and being satisfied they are correct, shall record each measurement taken in a measurement book in the form shown in Measurement Instruction 31.

To find the rating of the yacht he shall add correct length L, 2d and the square root of sail area, S, set forth in the third column, then subtract freeboard, F, and divide by 2.37. The result shall be the rating.

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