

Effective date: 2024-03-04  
Status: Approved

# Class Rules



## International Twelve Metre Association



The Twelve Metre is one of the original World Sailing International Classes. The first yachts date to 1907.

sport / nature / technology



# 12

## INTERNATIONAL TWELVE METRE CLASS RULE

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## **PREAMBLE**

This Class Rule approved by World Sailing replaces all previous editions effective 1 November 2018.

This revised Class Rule, particularly those sections relating to construction and survey, is intended for yachts which are raced inshore "around the buoys" with tenders or assistance present, as opposed to offshore in dangerous wind and sea conditions with or without tenders.

Over 180 International Twelve Metre Class yachts have been built since 1907 - a period of more than one-hundred ten years. In the late 1990's there was considerable renewed interest in the racing of Twelve Metre Class yachts of differing periods.

This version of the Class Rule, while retaining the development nature of the Twelve Metre Rule, has added appendices which address disparities occurring over the years due to changes in the International Rule and advancements in yacht design, construction, and performance.

## **SECTION A - GENERAL**

### **1 LANGUAGE**

- 1.1 The official language of the International Twelve Metre **Class Rule** is English. In questions of translation, the English text shall prevail.
- 1.2 A term used in its defined sense is printed in "**bold**" if defined in this **Class Rule**. Other words and terms are used in the sense ordinarily understood in nautical or general use in English.
- 1.3 Unless otherwise prescribed, the word or words:
  - (a) "**Aft Girth Station**" (**AGS**) is the vertical transverse station positioned at the intersection of the stern profile and a waterplane 180mm above the **Measurement Waterline (MWL)**.
  - (b) "**Appendage**" means any element outside the **hull** up to the **sheerline** but excludes bowsprits. **Appendage** may also include an element of an **appendage** which may extend from outside the **hull** into the yacht (e.g. fin tower or rudder stock).
  - (c) "**Bottom**" means the area below a line 180mm above the yacht's **MWL**.
  - (d) "**Class Rule**" means the International Twelve Metre **Class Rule**.
  - (e) "**Chain girth**" is the measurement from the lowest point of the immersion triangle mark ("IM") to the centre of the "d1" mark with the measuring tape pulled taut at the **MGS**.

- (f) "**Deck**" means the upper surface of the **hull** inside the **sheerline** including cockpits, recesses, etc., and the transom.
- (g) "**Forward Girth Station**" (**FGS**) is the vertical transverse station positioned at the intersection of the bow profile and a waterplane 180mm above the **MWL**.
- (h) "**Freeboard**" is the vertical distance from the **sheerline** to the **MWL** at defined measurement stations.
- (i) "**Girth**" is the great circle length around the body of the yacht.
- (j) "**GRP**" means glass reinforced plastic.
- (k) "**Hull**" means the volume enclosed by the canoe body, **deck**, keel plate, and deadwood, but not the **keel**, rudders, or trim tabs.
- (l) "**ITMA**" means the International Twelve Metre Association.
- (m) "**Keel**" means the external ballast package below and attached to the keel plate or deadwood.
- (n) "**Lead**" means lead or lead alloys of specific gravity not greater than pure lead (11.40).
- (o) "**Measurement committee**" means the measurement committee at a regatta in which the yacht is entered or as nominated by **ITMA**.
- (p) "**Measured Length**" (**LBG**) means the length between the **FGS** and **AGS**.
- (q) "**Measurement Waterline**" (**MWL**) is the waterplane and associated waterline on the yacht at which she floats in Measurement Condition as defined in **Class Rule 48**.
- (r) "**Midship Girth Station**" (**MGS**) is the vertical station 0.55 **LWL** from the forward end of the **MWL**.
- (s) "**Owner**" means the owner, the owner's representative and, while racing, the skipper.
- (t) "**Racing rules**" means The Racing Rules of Sailing (RRS).
- (u) "**Sheerline**" is the imaginary line formed by the intersection of the fair extension of the **hull** and the **deck** in the transverse plane.
- (v) "**Skin girth**" is the measurement along the surface of the **hull** from the lowest point of the IM, to the centre of the "d1" mark at the **MGS**.

- (w) "**Topsides**" means the area of the hull above a line 180mm above the yacht's **MWL** and below the **sheerline**.
- (x) "**Tumblehome**" means the difference in maximum beam of the **hull** and the beam of the **deck** in any transverse plane on one side of the yacht.
- (y) "**Waterline Length**" (**LWL**) means the length on the **MWL**. (Ref. Rule 6.5).
- (z) "**World Sailing**," formerly International Sailing Federation (ISAF) or its predecessor, the International Yacht Racing Union (IYRU).

1.4 The word "shall" is mandatory; the word "may" is permissive.

## 2 INTERPRETATION

2.1 Interpretations of the **Class Rule** may be sought and shall be issued in a timely manner as follows:

- (a) Questions of interpretation shall be submitted in writing to the **ITMA** Technical Director.
- (b) The **ITMA** Technical Director shall consult with the **ITMA** Technical Committee.
- (c) As soon as possible, the **ITMA** Technical Director shall issue an interpretation in writing to the individual seeking the interpretation and to the **ITMA** Secretariat. The **ITMA** Secretariat shall inform all **ITMA** members and **World Sailing**.
- (d) Every two years all interpretations shall be reviewed by the **ITMA** Technical Committee and the **ITMA** Secretariat. If deemed appropriate, the interpretation shall be submitted to **World Sailing** to become an amendment of the **Class Rule** in accordance with **Class Rule** 3.

2.2 If a measurer is in doubt as to the application or interpretation of the **Class Rule**, the measurer shall seek an interpretation in accordance with **Class Rule** 2.1. The measurement shall be incomplete until the interpretation has been issued by the Technical Director.

## 3 AMENDMENTS

Amendments to this **Class Rule** may be made by **ITMA** and submitted to **World Sailing**.

4. (SPARE NO.)

## **SECTION B - INTERNATIONAL FORMULA**

### **5 RATING**

The rating, in metres, is given by the formula:

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

where:

L	=	length (metres)
d	=	girth difference (metres)
F	=	freeboard (metres)
S	=	sail area (square metres).

### **6 LENGTH (refer to Appendix B – Measurement Marks)**

#### **6.1 The length "L" in the rating formula shall be the sum of:**

- (a) Length Between Girth stations ("LBG") at a height of 1.5% of the class rating (180mm) above the **MWL** between the inner edges of the L1 marks; and
- (b) one and one-half times the difference between the sum of port and starboard **girths** at the **FGS** measured to points "O" located at 5% of the class rating (600mm) above the L1 mark, and twice the vertical height from the L1 mark to the "O" points (1.2m); and
- (c) one-third of the difference between the sum of port and starboard **girths** at the **AGS**, measured to the **sheerline** above the L1 mark, and twice the vertical height from the **sheerline** to the L1 mark.

#### **6.2 For the purpose of calculating the rating, the girth difference at the **FGS** as defined above shall not be taken as less than 3% of the class rating (360mm); the girth difference at the **AGS** shall not be taken as less than 10% of the class rating (1.2m).**

#### **6.3 An additional vertical transverse station, **L2 Aft Girth Station (L2AGS)** is to be positioned at the intersection of the stern profile and a waterline 360mm above the **MWL**. A girth is to be measured at this station from **sheerline** to **sheerline** (or the intersection of the sides of the yacht with the transom) via the centreline on the bottom of the **hull** at the **L2AGS**. If the girth difference at this **L2AGS** station less twice the vertical height is less than 65% of the stern-girth difference at L1, one third of 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 0.380m.**

#### **6.4 No part of the **hull** or rudder(s) at or below 150mm below the **MWL** shall extend beyond **FGS** or **AGS**.**



- 6.5 The waterline length (**LWL**) shall be the length on the **MWL** plane, between the forwardmost of:
- (a) the forward L mark (subject to any "bridging" which may be required under **Class Rule 16.2**) or the forwardmost part of the forward rudder (if any);
- and the aftermost of:
- (b) the aft L mark at the aftermost part of the **hull** at or below the **MWL**, including the axis of the rudder stock at the **MWL** and any fairing strips attached to the **hull**, but excluding the rudder and normal rudder hangings.
- 7 MID-SHIP GIRTH DIFFERENCE (refer to Appendix B – Measurement Marks)
- 7.1 The girth difference "d" in the rating formula shall be the sum of the differences between the **skin girth** and **chain girth** on the port and starboard sides of the yacht measured at the **MGS** and measured from the lowest point of the immersion mark (IM) to points on the surface of the **hull** 12.5% of the class rating (1.500m) below the **MWL**.
- 7.2 The **skin girth** is the measurement along the surface of the **hull** from the lowest point of the immersion triangle mark (IM) to the centre of the "d1" mark. The **chain girth** is the measurement between the same points with the measuring tape pulled taut.
- 7.3 The yacht shall be so designed that it is possible to place the "d1" marks on the surface of the **hull** and to measure a continuous **skin girth** at the station. The radius of the **hull**, measured in any horizontal plane parallel to the **MWL** at or above the "d1" mark, shall not be less than 1.8m.
- 8 FREEBOARD (refer to Appendix B – Measurement Marks)
- 8.1 The freeboard "F" in the rating formula shall be the lesser of:
- (a) 1.210m, or
  - (b) one half of the sum of the mean **freeboards** at the following stations:  
**FGS** – Freeboard Forward (FF),  
**MGS** – Freeboard Midships (FM),  
**AGS** – Freeboard Aft (FA),  
minus 0.6m
- i.e.,  $F = [(FF + FM + FA)/2] - 0.6m$ .
- 8.2 When calculating the rating, FA shall not be taken as more than 0.825 of FF. The actual FF shall not be less than 1.2 times the value of FM, including a reduced value of FM if used for calculating the rating; and

shall not be taken as more than 1.5 times FM.

## 9 SAIL AREA

- 9.1 Sail area "S" in the rating formula shall be the sum of the rated area of the mainsail and the rated area of the foretriangle (see **Class Rule 33**).

## 10. PROPELLER ALLOWANCE

If a yacht is fitted with an engine and propeller which conform in every way to the conditions prescribed below while racing, the sail area calculated in **Class Rule 9** above shall be multiplied by the following factor prior to use in the rating formula in **Class Rule 5**. If an engine and propeller are not fitted or the engine/propeller installation does not comply with all the following criteria, the propeller factor shall be 1.000.

Centreline of strut or shaft drive where the plane of propeller shaft or strut is not skewed relative to the yacht's centreplane (skew defined below)

$$\text{Propeller factor} = 0.985$$

Skew is defined as the angle between the propeller shaft run and the **hull**, calculated as:

Offset = the distance from the geometric centre of the propeller hub to the nearest point on the **hull**.

Shaft length = the length of the shaft from its exit at the **hull** to the geometric centre of the propeller hub.

Skew Angle = the inverse-sine of offset divided by shaft length.

If Skew Angle is less than 20 degrees – Propeller Factor = 0.985.

If Skew Angle is greater than 20 degrees – Propeller Factor = 0.975.

This factor shall be applied as follows:

S (for use in the **Class Rule 5** Rating Formula) = S(from **Class Rule 9**) x Propeller Factor.

To qualify for this correction all the following conditions shall be observed.

- (a) The yacht shall be able to achieve a speed of 7 knots under power with bare poles in still conditions.
- (b) The propeller diameter shall not be less than 400mm and may be solid, folding or feathering. (No additional allowance is to be made for fixed blade propellers.)
- (c) The propeller, shafting, aperture, or strut drive shall be exposed to the water flow whilst racing and shall not be fitted with covers or fairing strips.

- (d) The engine, shafting, and propeller must be permanently installed.
- (e) If the propeller is fitted to an exposed shaft the shaft shall be circular and at least 28mm in diameter. Any exposed shaft strut shall have a minimum chord length of not less than 100mm for at least 75% of its span and a thickness of not less than 20mm. The strut boss shall be at least 55mm in diameter at any point and a length of not less than 100mm.
- (f) If the propeller is fitted in an aperture the clearance from the aperture to a propeller blade in any position shall not be less than 50mm.

If the propeller is fitted to a strut drive (including sail drives), the strut chord length at 1/3 of the span from the **hull** to the centreline of the propeller shall be greater than 170mm. The minimum thickness of the strut at any point shall not be less than 40mm. The boss diameter of the strut drive shall exceed 95mm and the boss length shall exceed 170mm.

## **SECTION C – LIMITATIONS AND PENALTIES**

### **11 DRAFT**

- 11.1 The maximum draft allowed without penalty shall be  $0.16 \times (\text{LWL}) + 500\text{mm}$ .
- 11.2 If the draft exceeds that allowed in **Class Rule** 11.1, three times the excess shall be added to the rating.
- 11.3 The draft shall be taken as the vertical distance below the **MWL** plane (with the yacht level fore and aft and athwartships) to the lowest point of the **hull** or **appendage** in any position.

### **12 DISPLACEMENT**

- 12.1 The displacement of the yacht below the **MWL** in cubic metres shall not be less than  $(0.2 \text{ LWL} + 0.15)^3$  without penalty.
- 12.2 If a yacht has a displacement less than that required by **Class Rule** 12.1, the difference between the length on **LWL** to which her actual displacement corresponds and her actual waterline length shall be doubled and added to the length measurement "L" in the rating formula.
- 12.3 The displacement shall be determined by one of the following methods:
  - (a) By calculation from a lines plan or 3D CAD model derived from the electronic scanning of the hull carried out by the measurer or an independent third party.

- (b) By calculation from the lines plan of the yacht "as built" which has been checked for accuracy on the yacht by the measurer
- (c) By weighing using a certified scale, in which case a copy of the current certificate of inspection and certification of the scale(s) shall be appended to the measurement report from the measurer.

### 13 BEAM

- 13.1 The beam, measured at the point of greatest beam in the plane one-third of the **freeboard** at the **mid-ship girth station (FM)** above the **MWL**, shall not be less than 3.6m. Any deficiency shall be multiplied by 4 and added to the length measurement "L" in the rating formula.
- 13.2 The beam of the **hull**, including any **appendage**, measured at any point below 1.7m below the **MWL** shall not exceed 3.6m.

### 14 TUMBLEHOME (refer to Appendix C)

- 14.1 The **tumblehome** on each side of the yacht shall not exceed 2% of the extreme beam without penalty.
- 14.2 When the **tumblehome** exceeds the amount allowed in **Class Rule** 14.1, three times the excess shall be added to the rating.

### 15 SHEER AND SHEERLINE

- 15.1 The sheer of the yacht between the point 75mm aft of the foremost point of the **hull** and **AGS** shall be a fair continuous concave curve.
- 15.2 If compliant with **Class Rule** 15.3, the **sheerline**, for measurement purposes, shall be taken as the intersection of the extensions of the lines of the **deck** and the **hull**.
- 15.3 The **hull-deck** joint may be of any shape in the transverse vertical plane within 75mm inboard of the maximum local beam and 75 mm below the adjacent **deck** except it shall not fall outside the **sheerline**.
- 15.4 If the **hull-deck** joint does not comply with **Class Rule** 15.3 the **sheerline** shall be taken as the farther outboard of:
  - (a) the inboard edge of the **hull-deck** connection; or
  - (b) the limit of the **tumblehome**.

### 16 HOLLOWS (refer to Appendix D)

- 16.1 There shall be no hollows in the surface of the **hull** between the **MWL** plane and a line 75 mm below and parallel to the **sheerline** except as follows:

- (a) at the stern within the buttock line 460mm from the yacht's centreline and below L1 (180mm above the **MWL**);
- (b) hollows which do not occur at measurement points and which do not exceed 1.0 mm in depth in a length of 1.0 m, or 3mm in any length.
- (c) minor hollows which apparently did not exist at the time of the initial measurement of the yacht but have appeared as a result of the sailing of the yacht

16.2 If there is an irregular hollow in the stem of the yacht within a vertical distance of 150mm above or below the **MWL** plane, it shall be bridged within the limits of that vertical distance for the purpose of determining the waterline length. For the purpose of this rule, a hollow shall be considered to be irregular if:

- (a) a hollow starts and finishes within 150mm above and 150mm below the **MWL**; or
- (b) the radius of the concave curve is less than 75mm; or
- (c) the hollow is caused by the intersection of straight lines or convex curves; or
- (d) any part of the stem within 150mm of the **MWL** is forward of the stem above it.

A hollow in the stem shall not affect the placing of the length mark "L". (refer to Appendix D).

17 (SPARE NO.)

## **SECTION D - CONSTRUCTION**

18 HULL

18.1 Compliance with the following requirements does not necessarily ensure that a yacht is of adequate structural strength consistent with, and not less than, the requirements of Lloyd's Rules and Regulations for the Construction and Classification of the International Rating Classes for Twelve Metre yachts (Lloyd's). The structural strength of the yacht is the responsibility of the **Owner** and their designers, builders and crew, and not **World Sailing** or **ITMA**.

18.2 The **hull**, excluding **keel**, shall be constructed according to plans found to comply with the minimum weight distribution by the **ITMA** Technical Director or **ITMA** nominee. The **ITMA** Technical Director or **ITMA** nominee shall only approve plans such that the **hull**, excluding **keel**, is neither of less weight nor more beneficial weight distribution than given below.

18.3 The total structural weight in the various zones of the **hull** given below shall be such that the average weight per square metre of external **hull** surface area are not less than the following:

(a) **Bottom** (measured from the forward end of **LBG**):

Zone 1	0% to 25% LBG	25.0 kg/square metre
Zone 2	25% to 75% LBG	31.0 kg/square metre
Zone 3	75% to 100% LBG	25.0 kg/square metre

(b) Topsides 18.0 kg/square metre

Additional for 1m length in way of mast 9.0 kg/square metre

(c) Deck 17.0 kg/square metre

Additional for 1m length in way of mast 9.0 kg/square metre

18.4 Nowhere shall the topsides or **bottom** shell plating, shell laminates or planking be less than 12.0 kg/square metre.

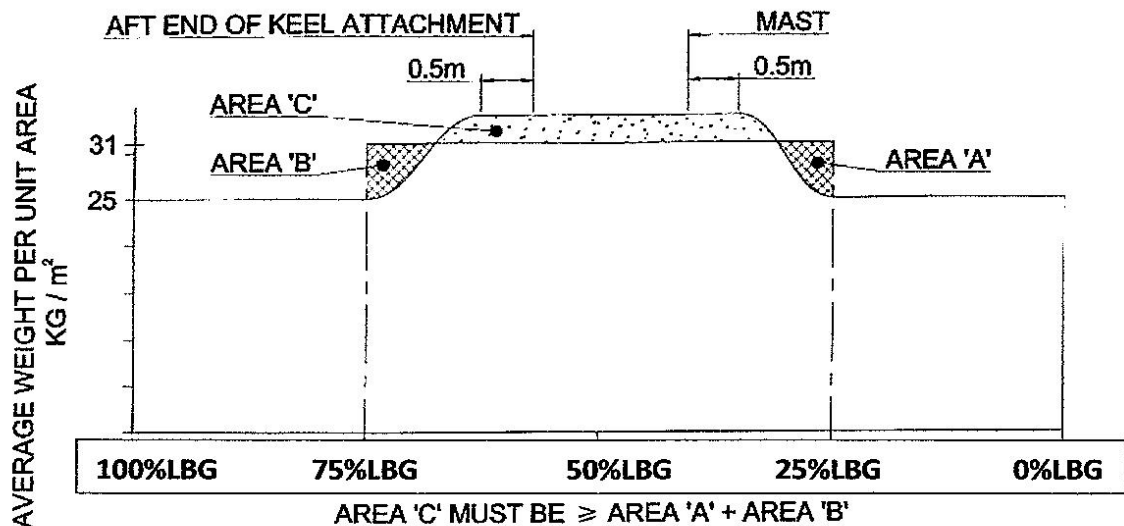
18.5 The average weight distribution requirements above shall include, in addition to **hull** shell, all normal **hull** structure such as frames, floors, beams, web frames, longitudinals, girders, knees, brackets and centreline structure. It shall not include local structural items or structural reinforcement for fittings such as chainplates, forestay fittings and structure, mast step, mast partners and control structure and runner sheave boxes.

18.6 The amidships block increase in required weight distribution for the **bottom** may be faired into the required end distribution, but the total area in the amidships area shall be maintained. Refer to Figure 1. Correspondingly, the same approach may be taken in the topsides and **deck** for the required weight distribution increase in way of the mast.

18.7 If this non-rectangular distribution is used in the **bottom** amidships area, then the distribution shall be constant between a point 500mm forward of the mast and a point 500mm aft of the aft most point of attachment of the **keel** to the **hull**. Refer to Figure 1.

18.8 In no case is the weight per unit area in the amidships **bottom** region to reduce below the average weight per unit area of 25 kg/square metre.

18.9 If the non-rectangular distribution is used for the required increase in the topsides and the **deck** in way of the mast, it shall extend at least 300mm forward of the forwardmost position of the front side of the mast to 300mm aft of the aftmost position of the aft side of the mast respectively.



**BOTTOM WEIGHT DISTRIBUTION DIAGRAM**

**FIGURE 1**

- 18.10 Where framing is used to achieve the required weight per unit area, the area used to assess the unit weight shall be a vertical band bounded by one half of the major transverse or web frame spacing each side of that major frame or web respectively, and the girth length at that position. In the case of no framing; the limits of the panel shall be the bow, 25% LBG, 75% of LBG, and the stern.
- 18.11 Where, in the **bottom** zone, a frame bay falls across a vertical zone boundary (i.e. 25% LBG or 75% LBG), the required weight distribution shall comply with the requirements each side of the zone boundary.
- 18.12 There shall be no negative tolerance on the overall weight distribution of the yacht. However, minor (maximum 5%) local negative departures from the requirements will be permitted in each of the three horizontal zones (i.e. **bottom**, topsides and **deck**) in the bow to 25% LBG and the 75% LBG to stern regions, provided the weights and moments of these regions are not less than the weight and moments of the constant weight per unit area of these regions when moments are taken about the 25% LBG and 75% LBG points respectively.
- 18.13 The **hull**, excluding **keel**, shall be made only from the following materials or their combinations, except for fastenings which may be of any material:
- Aluminum alloy--5000 and 6000 series alloys with a specific gravity greater than 2.65;
  - GRP**--E, R, S and S2 glass polyester, vinyl ester or epoxy resins and sandwich cores of any commercially available type;
  - Wood--any species with any **GRP** laminate or alloy of steel, aluminum, copper or nickel for floors, knees, etc.

18.14 For **GRP** yachts, the internal surface of the **hull** shall incorporate a lightweight layer of woven reinforcement containing a coloured tracer roving or thread at centres not exceeding 300mm.

18.15 Free flooding compartments (i.e. compartments or containers that hold liquid such that they may increase performance of the yacht) are prohibited.

18.16 A patented design relating to **hull** configuration is permitted provided the design is available for free use by the **owner** of any other International Twelve Metre yacht.

## 19 APPENDAGES (including rudders, trim tabs and keel wings)

19.1 Rudders and trim tabs shall be constructed only of the following structural materials: wood, aluminum alloy, **GRP**, carbon fibre and/or Kevlar(TM) reinforced plastic, stainless steel or steel. Titanium may be used for the rudder stock and hangings; lead for the trim tab. Any commercially available core material may be used.

19.2 No part of a rudder which extends aft of the aft end of the **LWL** or forward of the forward end of the **LWL** shall exceed 190mm in thickness.

19.3 The total number of movable surfaces shall not exceed two.

19.4 A fairing strip shall not constitute a movable **appendage** provided that:

- (a) it is not controllable,
- (b) it is flexible,
- (c) it provides fairing only onto the movable **appendage**, and
- (d) its flexible chord length is less than 200mm or its chordwise length of contact with the movable **appendage** aft of the rotational axis is less than 10% of the chord of the movable **appendage**.

19.5 **Appendages** shall not be retractable.

19.6 **Appendages** may be adjusted in rotation about a single axis only, provided that **RRS** 51 (Shifting Ballast) and 42 (Means of Propulsion) are not infringed. This rule is not infringed by the normal use of a trim tab during manoeuvring of the yacht.

19.7 The **ITMA** Technical Director shall be informed in writing of any changes to **appendages**.

## 20 KEEL AND OTHER BALLAST

20.1 The **keel** and other ballast shall be constructed of material of specific



gravity not greater than **lead**.

20.2 Moveable **keels** are not permitted.

20.3 Centreboards and similar contrivances are prohibited.

20.4 The **ITMA** Technical Director shall be informed in writing of any changes to the surface shape of the **keel** or other ballast.

## 21 DECK

21.1 The **deck** shall not have negative camber, i.e. over the deck beams it shall not fall below a straight line from the **sheerline** on one side of the yacht to the **sheerline** on the other.

21.2 Recesses in the **deck** appropriate in size to accommodate items of gear and equipment are permitted as follows:

- (a) A trough to accommodate the spinnaker pole provided it is not wider than 550mm or deeper than 200mm (measured from the immediately adjacent **deck**), and provided it does not extend further aft than the forward side of the mast.
- (b) A recess to accommodate the forestay attachment and jib tack fitting provided that it does not extend further aft than 300mm from the forward end of the J measurement. This recess may be continuous with the trough for the spinnaker pole.
- (c) Fittings including winch bases may be in reasonably watertight recesses in the **deck** except that winch drums shall be above the level of the **deck** or in cockpits.
- (d) Recesses for fittings may drain into the **hull** through small holes. (See also **Class Rule** 24.)

## 22 COCKPITS (refer to Appendix C)

22.1 Except as otherwise permitted below, cockpits may be positioned anywhere aft of the mast.

22.2 The total area of cockpits shall not be less than 4.6 square metres or more than 10.0 square metres.

22.3 Recesses permitted in **Class Rule** 21.2 shall not be included in any calculation of the cockpit area, provided the total area of such recesses excluding the spinnaker pole trough does not exceed 1.5 square metres.

22.4 Forward of a line drawn athwartships 3.0m aft of the mid-ship girth station, the distance from the edge of a cockpit to the **sheerline** shall not be less than 760mm. Aft of this line the corresponding minimum distance shall be 380mm.

- 22.5 Except for small recesses to accommodate the lower parts of the yacht's steering wheels, the cockpit sole shall nowhere be lower than 380mm above the **MWL** plane.
- 22.6 A cockpit may extend under the side **deck** provided no part of the cockpit side within a vertical distance of 150mm from the cockpit sole is less than 30 degrees to the horizontal measured as shown in Appendix C. No part of a cockpit shall be less than 380mm from the **sheerline** viewed in plan.
- 22.7 Each cockpit shall be able to drain overboard by not fewer than two scuppers the total area of which is not less than 20 square centimetres. The total area of scuppers in all cockpits shall not be less than 50 square centimetres.
- 22.8 Self-bailers are permitted but shall not be included in the calculation of the area of the cockpit scuppers.
- 22.9 Each cockpit shall be watertight except for cockpit drains and small openings permitted under **Class Rule 24**, and for openings, each not to exceed 0.1 square metres in area, which are closed by screw or hinged covers and which are not lighter than the structure they replace.
- 22.10 Fixed clear panels in the side of a cockpit are permitted provided they are not lighter than the structure they replace.
- 22.11 The cockpit-deck joint may be of any shape in a transverse vertical plane within 75mm outboard of the cockpit side and 75mm below the adjacent deck. This treatment shall also apply to the cockpit ends and plan view discontinuities of the cockpit. The area of the cockpit shall be measured to the inboard-most points of the cockpit-deck joint provided the joint arrangement does not extend more than 75mm below the local **deck** level.

## 23 HATCHES AND COMPANIONWAYS

- 23.1 There shall be not more than two hatch openings in the **deck** forward of the mast, and not more than four hatches or companionways aft of the mast.
- 23.2 The minimum distance from a hatch opening to the **sheerline** shall not be less than 500mm.
- 23.3 The total area of the hatches forward of the mast shall not exceed 1.2 square metres. Each hatch shall be closed by a cover attached to the **deck** by hinges, slides or similar arrangement.
- 23.4 The area of each hatch opening aft of the mast shall not exceed 0.6 square metres. A hatch cover is not required when such a hatch:
- (a) does not provide access to the inside of the **hull**; and

- (b) when the space below to which it does give access:
  - (i) is reasonably watertight;
  - (ii) has a volume which does not exceed 1.5 cubic metres; and
  - (iii) has drains overboard.

If these requirements are not met, there shall be a reasonably watertight cover attached to the **deck** or cockpit side by hinges or slides.

23.5 All hatch and companionway covers shall be not lighter than the structure they replace.

23.6 A companionway opening out of the side of a cockpit shall be fitted with a sill having a height of not less than 220mm above the cockpit sole. Companionways shall be provided with secure hatch covers and shutters which are substantially watertight up to the level of the **deck** when closed. The area of such a companionway shall be taken as the area of the opening in the **deck**.

23.7 Yachts which have their hatches and companionways modified to comply and continue to comply with the **World Sailing** Offshore Special Regulations Category 3 shall be exempt from all the Rule 23 requirements above.

## 24 MINOR OPENINGS

24.1 Small openings or holes in the **deck** or in the sides of cockpits, and which are above 220mm above the cockpit sole for passing rigging, lanyards or similar lines and attachments are permitted.

24.2 If the area of an opening or hole permitted in **Class Rule** 24.1 exceeds 40 square centimetres, a gaiter boot or other means of closing the opening shall be provided.

## 25 WINCH PLACEMENT

25.1 All winches other than halyard winches shall be mounted on or above **deck** or in a cockpit. They shall be so located as to be operated and tailed only from the **deck**, cockpit, or a hatch.

25.2 Headsail sheet winches shall not be placed so as to require a crewmember to operate or tail such winches from a position in the area bounded by a line drawn to contain the winch, the turning block, the **deck** edge and the shroud.

26 (SPARE NO.)

## **SECTION E - RIG**

### 27 MAST

- 27.1 The mast shall be constructed of wood, aluminum alloy, **GRP**, or any combination thereof. Thin plastic (polyethylene or similar) strips to form internal compartments to separate halyards, etc., are permitted.
- 27.2 The mast, including the luff groove or track, and any stiffening, shall comply with the following dimensions:

Location	Athwartships minimum (mm)	Fore/aft maximum (mm)	Section Area* Minimum (sq. cm)
At upper measurement band	121	194	143
At band top of "I"	194	292	366
At half height of "I"	243	358	572
At the Mast Datum located 180mm above the <b>sheerline</b>	243**	358	572**

\*The section area is the area of the mast forward of the transverse line through the forward edge of the luff groove or track.

\*\*For wooden spars, the width of the mast at the Mast Datum may be reduced by 5%. The maximum fore and aft length shall not exceed 358mm. A corresponding reduction in Section Area is permitted to a minimum of not less than 516cm<sup>2</sup>.

If the spinnaker pole track is integral with the mast tube it shall be included in the above maximum fore and aft dimensions. If the track is external to the mast tube it shall be considered a fitting and shall be no longer than necessary to set, fly and gybe the pole

- 27.3 Between the measurement points, the profile of the mast shall be a fair and continuous convex curve.
- 27.4 The weight of the mast, including all fittings, spreaders, hydraulic pipes and rams (but not mast jack, if any) and heel plug, but excluding standing and running rigging shall not be less than 454kg. The centre of gravity shall not be less than 9.5m (0.38 of the rule height of the mast) above a point 180mm above the **sheerline**.
- 27.5 The mast when weighed shall include the following:
- (a) All normal spreaders, jumpers, and diamond struts, instruments, instrument sensors, cameras, cables, hydraulic rams, and pipework; and all fittings required to sail the yacht, including mast heel plug (but not mast jacks even if installed inside the mast), halyard locks, vang brackets, spinnaker pole slides and fittings (but not the butt lifting chain or cable), gooseneck, gooseneck bracket or toggle, mast crane, headboard carriage

lock, headboard carriage (but excluding any pivoting section), rigging anchorage tangs (but not the tip cups), halyard and running rigging sheaves. Winches mounted on the mast shall not be included in the weight and centre of gravity of the mast. A correction for weight and centre of gravity shall be made by calculation to avoid the necessity for removal of mast-mounted winches.

- (b) The centre of gravity of the mast shall be measured with headboard carriage, if any, placed at the upper measurement band; and all sliding fittings except headboard car set in their lowest sailing position. A headboard car attached to the sail is not a carriage.
- (c) All standing and running rigging shall be removed and not included when the mast is weighed for rule compliance and the centre of gravity determined. Halyard messengers of not more than 4mm diameter and weighing not more than 15 grams per metre and sufficient for convenient re-leading may be used to replace internal portions of running rigging.
- (d) This list is not intended to be all-inclusive. The principle to be applied as to whether a particular item is included in the measurement of mast weight and centre of gravity is that if a component remains attached to the mast when the mast is removed from the yacht - except standing and running rigging, halyards and mast jacks - it shall be deemed to be part of the mast for measurement purposes.

27.6 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. The weight and position of corrector weights, if any, shall be noted on the Measurement Certificate.

27.7 The mast may move fore and aft at the **deck** only. Movement shall not exceed 155mm.

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

27.9 Masts that are permanently bent, deck stepped, or have axial rotation are prohibited. A mast, when first measured, is permitted to have a permanent set not exceeding 150mm between the upper and lower measurement bands.

27.10 Measurement Marks:

- (a) Mast Datum shall be marked on the forward, aft and side faces of the mast by punch mark or similar permanent reference at 180mm above the local **sheerline**.

(b) Measurement bands, not less than 20mm wide, shall be marked on the mast so that they are clearly discernible when racing as follows:

(i) Lower band, the upper edge of which shall not be more than 1.550m and not less than 1.220m above the Mast Datum; and

(ii) Upper band, the lower edge of which shall not be more than 25.0m above the Mast Datum.

27.11 When the boom is horizontal and at its lowest position on the mast, the line of the top of the boom, when extended, shall not be below the upper edge of the lower measurement band.

27.12 The highest point of the mainsail headboard on the mast shall not extend above the lower edge of the upper measurement band.

27.13 The luff groove or track on the mast shall be fixed and not move side to side on the mast section.

## 28 BOOM

28.1 The boom shall be made of wood, aluminum alloy, **GRP**, Kevlar™ or aramid and/or carbon fibre reinforced plastic or any combination thereof.

28.2 The boom, including the sail groove or track but excluding other fittings, shall not exceed 350mm in depth. Excluded fittings, including boom vang lugs and foundations, shall be of a size consistent with their sole use and shall not contribute to the overall strength of the boom. No part of the boom shall exceed 220mm in width. The boom shall not be less than 135mm in width, except in way of the gooseneck or clew fittings. Struts and outriggers are prohibited.

28.3 A permanently bent boom is prohibited. For the purpose of this rule, with aluminum booms a permanent set not exceeding 50mm over the length of the boom is permitted.

28.4 Regardless of the means by which the mainsail foot is tensioned, a stop shall be fitted to prevent the clew of the mainsail from extending beyond the maximum permitted value of "E". Accordingly, a measurement band of not less than 20mm wide shall be marked on the outboard end of the boom so that it is clearly discernible when racing. No part of the mainsail including a clew ring shall be aft of a line perpendicular to the top of the boom at the forward (inner) edge of the measurement band. (See **Class Rule 33.1.**)

## 29 SPINNAKER POLE

The spinnaker pole shall be made of wood, aluminum alloy, GRP,

Kevlar™ and/or carbon fibre reinforced plastic, or any combination thereof.

## 30 STANDING RIGGING

30.1 Standing rigging shall be made only of materials of specific tensile modulus not greater than  $2.9 \times 10^6$ m. (The specific tensile modulus is defined as the tensile modulus divided by the density.) Running backstays may be any material except carbon fibre and PBO. PBO may be used for the outer cover of the runner tail.

30.2 The maximum cross sectional dimension of a headstay or headstay support device shall not exceed 75mm.

30.3 Adjustment of the topmast jumpers is prohibited whilst racing.

31 (SPARE NO.)

## **SECTION F - SAILS**

### 32 SAILS - GENERAL

32.1 The yacht shall be rigged as a Bermudian sloop.

32.2 Except as otherwise prescribed in the **Class Rule**, sails shall be made and measured in accordance with the **World Sailing Equipment Rules of Sailing** (ERS). Terms printed in ***bold italics*** in **Class Rules** 32.3 & 32.4 are used in their ERS-defined sense.

32.3 **Sails** shall be ***soft sails*** made from ***woven ply*** or ***laminated ply*** or a combination of these. The maximum modulus of any fibre in the ***body of the sail*** and any ***reinforcement*** shall not exceed 1550 grams per denier.

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

32.5 The following are specifically prohibited:

- (a) double-luffed sails;
- (b) artificially thickened sails, e.g., foamed sails;
- (c) double-surface inflatable sails, whether inflated by the action of the wind or not;
- (d) battens and headboards in spinnakers and in headsails with a foot length greater than  $1.1 \times J$ .

32.6 National letters and sail numbers are required to be carried on the mainsail only, altering RRS 77 and Appendix G 1.1.

- 32.7 The following minimum sizes for national letters and sail numbers are prescribed, altering RRS 77 and Appendix G 1.2:

Height	660mm
Width	440mm*
Thickness	100mm
Space between adjoining letters/numbers	130mm

\*except the number 1 and the letter I

- 32.8 A headsail (genoa, jib, staysail, spinnaker or gennaker) shall not have a club-foot or foot-yard, or have more than one sheet or any other contrivance for extending the sail to other than a triangular shape.

### 33 RATED SAIL AREA

- 33.1 Mainsail. The rated area of a triangular mainsail equals  $0.5 \times P \times E$ , where:

- (a) P equals the distance between the upper and lower measurement bands on the mast; and
- (b) E equals the maximum distance from the inner edge of the boom measurement band to the foreside of the luff groove in the mast.

- 33.2 Fore-Triangle. The rated area of the fore-triangle is  $0.5 \times 0.85 \times I \times J$ , where:

- (a) "I" is the height of the fore-triangle measured from the Mast Datum on the forward side of the mast. "I" shall not exceed 18.750m.
- (b) The upper point of "I" shall be the highest of:
  - (i) the intersection of the line of the aft side of the forestay with the foreside of the mast;
  - (ii) the intersection of the line of the forward side of the headfoil into which the luff of a headsail is fitted, with the foreside of the mast;
  - (iii) the bearing surface of a jib or spinnaker halyard sheave or fairlead above which the sail cannot be hoisted;
- (c) "J" is the base of the fore-triangle measured from the forward side of the mast in its aftmost position to whichever gives the greatest measurement:
  - (i) the intersection of the line of the aft side of the forestay with the **deck** (line connecting the **sheerlines**);
  - (ii) the intersection of the line of the forward side of the headfoil with the **deck** (line connecting the **sheerlines**);



- (iii) the outer extent of the spinnaker pole with the spinnaker pole in the position which gives the largest measurement.

## 34 MAINSAIL

- 34.1 The distance between the aft side of the mast and the aftmost edge of the headboard and/or headboard carriage on the mast shall not exceed 362mm. If there is a luff groove in the mast, the measurement shall be taken to the fore-side of the groove.
- 34.2 The total width of the mainsail, including the luff tape, at half and three-quarter heights shall not exceed 68% and 41%, respectively, of the maximum permitted foot length "E". These measurements shall be taken from the half and three-quarter points on the leech to the nearest points on the luff. Hollows in the leech in way of the measurement points shall be bridged.
- 34.3 Not more than four (4) batten pockets shall be fitted in the leech of the mainsail and shall divide the leech into approximately equal parts.
- 34.4 The length of battens is not limited.

## 35 GENOA, JIB, AND STAYSAIL

- 35.1 **RRS** 50.4 shall not apply, but the maximum half width of any genoa or staysail, measured between the midpoints of the luff or leach, shall not exceed 60% of the length of the foot.
- 35.2 The maximum foot length of any genoa or staysail shall be  $J + 4.8\text{m}$  where J is the maximum of the J that is defined in **Class Rules** 32(c)(i) and 32(c)(ii). When in use, a genoa or staysail shall be tacked on the **hull** such that the clew cannot extend more than 4.8m aft of the forward side of the mast.
- 35.3 Jibs with a foot length of  $1.1 \times J$  or less may be fitted with not more than four (4) battens, which shall divide the leech into approximately equal parts. Jib battens may be any length. The half width of a jib shall not exceed 50% of the foot length.

## 36 SPINNAKER

- 36.1 A spinnaker shall be symmetrical about the line joining the head to the centre of the foot. The luff and leech shall be of equal length. The luff and leech shall be taped with stretch-resistant tape.
- 36.2 The lengths of the luff and the leech shall not exceed  $0.8[\sqrt{I^2 + J^2}] + 2.5\text{m}$ . (See **Class Rule** 33.2 for the definitions of I and J.)
- 36.3 The length of the foot, measured round the edge of the sail, shall not exceed  $2.5 \times J\text{m}$ .
- 36.4 The half width shall not be less than 75% of the length of the foot. The

half width shall be taken as the distance between the midpoints of the luff and the leech measured as the shortest path on the surface of the sail.

- 36.5 Intentional openings in the sail, in addition to normal cringles and reefing eyelets, are permitted provided the sail is substantially flat in the vicinity of the openings.

## 37 GENNAKER

- 37.1 A gennaker is permitted provided the:

- (a) luff length shall not exceed  $\sqrt{(I^2 + J^2)}m$ ;
- (b) leech length shall not exceed  $\sqrt{(I^2 + 4.8^2)}m$ ;
- (c) foot length shall not exceed  $J + 4.8m$ ;
- (d) half width shall not exceed 100% of the foot length measured between midpoints of the leech and luff.

- 37.2 The gennaker shall be set:

- (a) with the tack on the centreline of the **hull** in close proximity to the **deck** and no farther forward than the forward limit of "J" ; or
- (b) as for a spinnaker in accordance with **RRS 50**.

## 38 (SPARE NO.)

# **SECTION G - OTHER RULES**

## 39 RUNNING RIGGING, FITTINGS AND OTHER EQUIPMENT

- 39.1 Running rigging may be made of steel, nickel/cobalt alloy or rope of natural or synthetic materials such as Kevlar™ or aramid, Vectran™, and Spectra™, or similar materials. Carbon fibre is not permitted. PBO may be used for the outer cover of the runner tail.

- 39.2 Fittings may be made of any material.

- 39.3 While racing, a yacht shall carry on board the equipment listed in **Class Rule 48.4**. All equipment shall be bona fide to the nature common to the usual fittings of a yacht and shall not be of the nature of ballast.

- 39.4 Liquids and consumable stores including containers carried while racing shall not exceed 80kg.

## 40 CREW

Unless otherwise prescribed, there shall not be more than fourteen (14) persons on board while racing.

#### 41 ACCOMMODATIONS

Twelve Metre yachts of Division A (Grand Prix) and Division B (Modern) are not required to have accommodations. Accommodation requirements for other divisions are defined in Appendix E.

### **SECTION H - ADMINISTRATION**

#### 42 APPLICABLE RULE, RULE COMPLIANCE AND OWNER'S RESPONSIBILITY

42.1 Yachts shall be constructed and surveyed in accordance with, and otherwise comply with, the **Class Rule** and scantlings (Lloyd's) current when the yacht was first launched or later certified by Lloyd's, except that:

- (a) replacement spars and equipment shall comply with the **Class Rule** current at the time of replacement;
- (b) sails shall comply with the current **Class Rule**; and
- (c) a yacht which has had the shape of the underwater part of her hull excluding the keel altered, or the position of a rudder post altered, or **sheerline** altered, shall be measured for waterline length and freeboard under the class rule current at the time of alteration.

42.2 ("Gross Non-compliance Rule") Prior to presenting a yacht for survey or measurement, it is the **Owner's** responsibility to assure that the yacht complies with these **Class Rules**. If, in the opinion of the measurer a yacht presented is grossly out of compliance with the applicable rules, he shall so report to the **ITMA** Technical Director and, if appropriate, the jury at a regatta. At a regatta, gross non-compliance in and of itself shall be grounds for action under **RRS** 69.

42.3 The **Owner** shall be responsible to permit and assist all inspections by surveyors, measurers and measurement committees, and shall afford all reasonable facility to carry out such inspections in regard to measurements, marks, fittings, construction and materials.

42.4 The **Owner** shall be responsible to see that the yacht, its spars, sails and equipment comply with the **Class Rules** and **RRS** at all times while racing, and that any alterations, replacements, and repairs do not invalidate the measurement or survey certificates. The **Owner** shall notify the measurer and the **ITMA** Technical Director in writing of any alterations, replacements, or repairs which could invalidate the measurement or survey certificates.

#### 43 MEASUREMENT CERTIFICATE

43.1 The measurement certificate form, Appendix A shall be used by **ITMA** in issuing measurement certificates in accordance with the **Class Rule**.

43.2 To obtain a measurement certificate:

- (a) For a new yacht, the owner shall apply to **ITMA** for a sail number after having paid the international class fee to **World Sailing**.
- (b) For all yachts, the owner shall have paid the current **ITMA** membership fee for the yacht.
- (c) The **Owner** shall arrange for a measurer approved in accordance with **Class Rule** 44 to measure and carry out a post-construction inspection on the yacht in accordance with the **Class Rule**.
- (d) Following measurement and post-construction inspection, the measurer shall send the original rating and post-construction inspection report certificates, completed, to the **ITMA** Technical Director.
- (e) The **ITMA** Technical Director shall satisfy himself, so far as he can, that the yacht has been measured and inspected correctly and that the rating has been correctly calculated.
- (f) When so satisfied, the **ITMA** Technical Director shall endorse the measurement certificate and return it to the **Owner** and provide a copy to **ITMA**. The yacht's certificate shall be valid only upon the payment of all measurer's fees and endorsement fees.

43.3 The measurement certificate ceases to be valid:

- (a) four years after the date of issuance;
- (b) if there is any change in the yacht's displacement or trim, including alterations in the internal ballast;
- (c) if there is any change made to the **hull** or its appendages that may alter any of the measurements on the measurement certificate;
- (d) if any dimension of the rated sail area is increased;
- (e) if the position of the forestay is moved;
- (f) the position of the mast at any time reduces the J measurement by more than 200mm, or the pivot point of the mast is moved by more than 75mm;

- (g) any alteration is made which would cause the yacht not to comply with any requirements of the **Class Rule**, or measurement certificate.
- 43.4 In the case of **Class Rule** 43.3(a) above, the certificate may be re-validated following a successful afloat test, and receipt of an **Owner's** declaration, in writing, that no changes have been made which could invalidate the measurement certificate or the survey certificate.
- 43.5 In the cases of **Class Rule** 43.3 (b), (c), (d) and (e) above, a new measurement certificate may be issued or the current certificate re-validated following partial or complete re-measurement or resurvey, as appropriate.
- 43.6 A yacht shall have only one valid measurement certificate at any one time. A measurement certificate is defined as a certificate which certifies a yacht is in accordance with the main body of this **Class Rule** and does not have any Appendix E Age/Design Allowance Factor applied to the rating of the yacht. If a yacht is eligible to be measured and its rating calculated using Appendix E, the measurement certificate shall be endorsed "Appendix E Certificate."
- 43.7 Copies of a yacht's entire measurement certificate shall be provided to anyone upon written request to **ITMA**, which may charge a nominal administrative fee. A copy of a yacht's entire certificate shall be provided by the **Owner** to the **measurement committee**, if requested. Only the front page of the measurement certificate needs to be submitted as a condition of entry in an **ITMA** regatta.
- 44 MEASURERS
- Measurers qualified to carry out post construction inspections or measure yachts shall be appointed by the **ITMA** Executive Committee upon the recommendation of the **ITMA** Technical Director and the Technical Committee.
- A measurer shall not inspect for compliance with minimum weight distribution; or measure yachts, spars, sails and other equipment which he owns, designed or built, or in which he has a vested interest.
- 45 PLAN APPROVAL AND POST-CONSTRUCTION INSPECTION
- 45.1 It shall be the **Owner's** responsibility to see that the yacht is constructed in accordance with the approved plans and the weight distribution requirements in **Class Rule** 18.
- 45.2 Before construction, four (4) copies of the construction plans and weight distribution data shall be submitted to the **ITMA** Technical Director for assessment of the compliance with the minimum weight distribution requirements of the **Class Rule**.
- 45.3 The **ITMA** Technical Director shall hold submitted plans in confidence,

with a copy made available only to the measurer appointed to carry out post-construction inspection in accordance with **Class Rule 45**.

45.4 These plans shall include:

- (a) shell expansion or body plan or girth table;
- (b) sections at each major or web frame sufficient to enable all items of structure to be identified and assessed;
- (c) longitudinal construction profile and deck plan including cockpits and hatches. The plans shall be to scale and shall accurately depict the shape of the yacht so that surface areas can be checked.

45.5 The plans shall be to scale and shall accurately depict the shape of the yacht so that surface areas can be checked.

45.6 The construction plans shall show information for each of the allowable materials, for example:

- (a) aluminum or steel alloys - minimum thickness of plating and sizes of all structural members; alloy description and density.
- (b) **GRP** - full details of laminates including type of glass, type of material or cloth and the weight and thickness of each layer; total thickness of skins (inner and outer as required); thickness of framing encapsulation; resin type and density (generic and brand names); core types and densities (generic and brand names); designed glass content in each area; details of any non-**GRP** structural components.
- (c) Wood - species and their nominal minimum densities; thickness of skins/planking; dimensions of framing and stiffening members; fastening specification including glue (for weight analysis); details of non-timber structural components.

45.7 All but two copies of the plans and information provided by the **Owner** as part of the weight distribution assessment process shall be returned to the **Owner** with the remaining copies being held by the **ITMA** Technical Director.

45.8 Following construction but prior to fairing and painting, a post-construction inspection shall be carried out by the measurer to ensure the **hull** has been built in accordance with the minimum weight distribution requirement of the **Class Rule**.

45.9 The measurer shall determine if the girths for the calculation of areas provided in the submitted body plan or shell expansion drawing or girth table agree with the girths at each section on the yacht as built;

45.10 For a **GRP** yacht:

- (a) to assist the measurer carrying out the post-construction survey, it is recommended that the builder of a **GRP** hull keep detailed records of all materials and their positions in the **hull**.
- (b) the builder shall lay-up test panels using the same techniques, sequences and reinforcement as are used in the actual laminates for all major areas of the yacht; these test panels shall be made available to the measurer for inspection and calibration of electronic measurement equipment.

45.11 The measurer shall determine if the yacht is built in accordance with, or in excess of, that required in the plans approved by the **ITMA** Technical Director and unless otherwise specified by the **ITMA Technical Committee**, this post-construction inspection shall consist of the following:

- (a) macro examination of the yacht plating, skin laminate or planking and supporting structure using appropriate devices which may include normal measuring instruments, ultrasonic and other electronic equipment as the measurer and the **ITMA** Technical Director see fit;
- (b) thickness measuring of plating and structure by the drilling of three pilot holes of approximately 5mm in diameter in each of the **bottom**, topsides and **deck** regions of each of the three longitudinal **hull** zones as defined in **Class Rule** 18.3 for a total of 27 pilot holes;
- (c) at each pilot hole the thickness of plating, laminate (inner and outer skin as required) or planking at each hole shall be measured;
- (d) the dimensions of stiffeners (and encapsulation) shall be measured;
- (e) for aluminum alloy construction, alternative means of determining thickness may be used with the written consent of the **ITMA** Technical Director;
- (f) for **GRP** and wood yachts, in addition to the above, a minimum of two core samples of approximately 50mm diameter shall be taken from each longitudinal region of the yacht; these samples, which may be machined to round, shall be weighed to establish compliance with the approved weight distribution requirements;
- (g) the number and position of pilot holes and core samples over and above those required in the preceding shall be at the discretion of the measurer, or if in dispute with the **Owner**, of the **ITMA** Technical Director.

45.12 The measurer shall indelibly mark the position of all core sample positions after repair of the area where the core sample is taken. This

indelible mark, which shall be visible at all times, shall be:

- (a) for an aluminum yacht, a metal stamp/seal punched on the inside of the plating in the vicinity of the sample position;
- (b) for a **GRP** or wooden yacht, a signed identification card which is laminated to the inside of the yacht in the vicinity of the sample positions.

45.13 Removal of or interference with these identification marks will invalidate the yacht's measurement certificate.

45.14 The measurer may also require a still and/or video photographic record to be taken of the inside of the hull upon completion of the survey.

45.15 The measurer may also require the designed hull weight, excluding fittings, to be verified by weighing.

45.16 Upon satisfactory completion of the post-construction inspection, a certificate will be issued by the **ITMA** Technical Director. This certificate may be required to be produced at all **ITMA** sanctioned regattas.

45.17 The notice of race at a regatta may require that, as a condition of entry, yachts be fully re-surveyed prior to the regatta to assure continuing compliance with the **Class Rule**.

#### 46 MEASUREMENT - GENERAL

46.1 Measurement shall be taken in accordance with the **World Sailing Equipment Rules of Sailing** unless otherwise prescribed.

46.2 A measurer shall not take any measurement other than those necessary for determining the yacht's rating and its compliance with the **Class Rule**, except as directed by the **ITMA** Technical Director.

46.3 Unless otherwise prescribed, all measurements shall be taken without crew on board.

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

46.5 Calculations shall be rounded to the nearest millimetre, or to the third place of decimals for measurements of area or volume.

46.6 A yacht may be re-measured at the discretion of **ITMA** or the **measurement committee**.

#### 47 MEASUREMENT MARKS (refer to Appendix B)

47.1 Measurement marks shall be painted or fastened to the hull at the measurement points as shown in Appendix B.



47.2 The marks shall be clearly discernible and of a colour different from the **hull**. The measured points shall be marked by a cross head screw or indentation on the surface of the **hull**.

47.3 The mid-ship section **LWL** triangular immersion marks, IM, shall be in accordance with Appendix B.

## 48 MEASUREMENT AFLOAT

48.1 For the measurement afloat, the mast shall be vertical.

48.2 The measured displacement shall be determined by a method in **Class Rule** 12 for seawater of specific gravity of 1.025. For minor differences of specific gravity, the measurer shall allow 0.7mm sinkage for 0.001 reduction in specific gravity, measured at the time of measurement afloat.

48.3 Subject to **Class Rule** 6.6, the measurer shall check that the waterline length marks "L" are not within the length immersed, and that the lower corners of the IM marks just touch the water.

48.4 When the yacht is measured afloat, the following items shall be on board and in their normal fore and aft position of use. Other equipment may be removed.

- (a) spars and associated standing rigging, including spinnaker pole;
- (b) normal halyards, running backstays and one set of sheets for mainsail, genoa and spinnaker, together with associated turning blocks;
- (c) one (1) mainsail (with battens), one (1) genoa, and one (1) spinnaker;
- (d) one anchor of high holding power and weighing not less than 18kg, with not less than 10.0m of 10mm short link steel chain shackled to the anchor, and with not less than 90m of 16mm diameter nylon or Dacron rope; all of which shall be located within 3.0m of MGS and carried there while racing;
- (e) all winches, including drive units, pedestals and cranks, together with not less than two (2) handles total for deck winches;
- (f) hatch covers as specified in **Class Rule** 23;
- (g) not less than two (2) working fixed bilge pumps with handles, operable from the deck, with a total capacity of not less than 200 litres per minute, and fitted with a fixed overboard, or onto the **deck**, pump discharge. Additionally, electric bilge pumps are permitted.
- (h) floorboards as normally used;

- (i) all batteries (their position shall be noted on the certificate, and they shall be in that position while racing);
- (j) personal buoyancy, one per crew member;
- (k) running lights;
- (l) a horseshoe type lifebuoy or Man Overboard Module (MOM), fitted with a whistle kept on **deck** within reach of the crew; and
- (m) a First Aid kit.

48.5 The tops of the triangular side immersion marks IM, shall not be immersed when the yacht is in level trim, with equipment specified in **Class Rule** 48.4 plus the following on board in normal fore and aft racing position:

- (a) 11 crew;
- (b) sails; and
- (c) all additional equipment carried while racing not otherwise specified in **Class Rule** 48.4.

48.6 The measurer may check compliance with **Class Rule** 48.5 at any time, provided that reasonable time shall be allowed to dry out the yacht and equipment.

**12**

## INTERNATIONAL TWELVE METRE CLASS

Yacht's Name .....

National letters and Sail Number ..... Club .....

Designer .....

Builder ..... Building Year .....

Owner .....

Owner's Address .....

Lloyds R class certificate (Number or Date) .....

<b>RATING CERTIFICATE</b>	
This yacht has been measured by measurer(s) appointed by the International Twelve Metre Association and has been found to rate not more than 12.000 metres.	
This certificate is dated:	_____
Measurer	_____ Signature _____
Valid until	_____
Supersedes	_____
Is this an <b>Appendix E</b> Certificate?	Y / N <input style="width: 80px;" type="text"/>
Was <b>Appendix F</b> used for Measurement?	Y / N <input style="width: 80px;" type="text"/>
Signature _____ ITMA Technical Director	Stamp of Authority of the International Twelve Metre Association

Yacht's name :		Date
RATING CALCULATION		
<b>OVERALL LENGTH</b>		
Overhang Forward to FGS		
Overhang Aft to AGS		
Total Overhang (Subtract)		
<b>MEASURED LENGTH (LBG)</b>		
Girth at Bow		
Twice vertical Height at Bow (Subtract)	1.200	
Girth Difference at FGS		
Add 1.5 Girth Difference at FGS (min 0.540 m)		
Girth at Stern		
Twice vertical Height at Stern (Subtract)		
Girth Difference at AGS		
Add 1/3 Girth Difference at AGS (min 0.400 m)		
Add any penalty (Beam or Displacement)		
Sum of Length and Girth Corrections		
Age/Date Correction Factor (ADCF)(see page 3)		
<b>LENGTH (L)</b>		
Skin IM to d1 Port		
Chain IM to d1 Port		
d Port		
Skin IM to d1 Starboard		
Chain IM to d1 Starboard		
d Starboard		
Add d		
<b>Add GIRTH 2 d</b>		
Mean Freeboard Bow	Datum Sta.	Actual Sta.
Mean Freeboard Midship		
Mean Freeboard Stern		
Sum of Freeboards		Rating FB
<b>Subtract FREEBOARD, F</b>		
<b>Add SAIL AREAS (Square root)</b>		
<b>TOTAL OF MEASUREMENTS</b>		
PENALTY (Draft or Tumblehome)		0.000
<b>RATING</b>		
Date and Place of Measurement		
Measurer's Name(s)		Signature

<b>Yacht's name :</b>		<b>Date</b>	
Range Measurement (Yes or No)	Y / N	Date:	

## PENALTIES

Overhang Forward to <b>MWL</b>				
Overhang Aft to <b>MWL</b>				
Subtract from overall length				
Difference of immersion from salt to fresh water	Meas. Density			
<b>WATERLINE LENGTH (LWL)</b>				
Minimum Displacement for Zero Penalty [m3]				
Minimum Weight for Zero Penalty [ton] (Water of sg 1.025)				
<b>WEIGHT [tonne]</b>	Actual weight			
Equivalent LWL (for Displ. < min.)				
Difference				
DISPLACEMENT PENALTY (add to L)				
Displacement Determination Method				
<b>DRAFT (actual)</b>				
Max. Draft for Zero Penalty				
Difference (if positive)				
DRAFT PENALTY (add to Rating)				
<b>BEAM (Min)</b>				
Max Beam at 1/3 of Midship Freeboard				
Difference (if positive)				
BEAM PENALTY (add to L)				
Tumblehome Max. (2 x 2% of Extr. Beam)				
Extreme Beam				
Beam at deck				
Difference (if positive)				
TUMBLEHOME PENALTY (add to Rating)				

Date and Place of Measurement	
Measurer's Name(s)	Signature

Design/Age Correction Factor Calculation			
Age Date			
ADCF ( Table E-2)			
Hull Alteration Scope and Date			
Appendage Change Scope and Date			
Change/Alteration Correction ADCF			
Accommodation Deficiency Ballast			

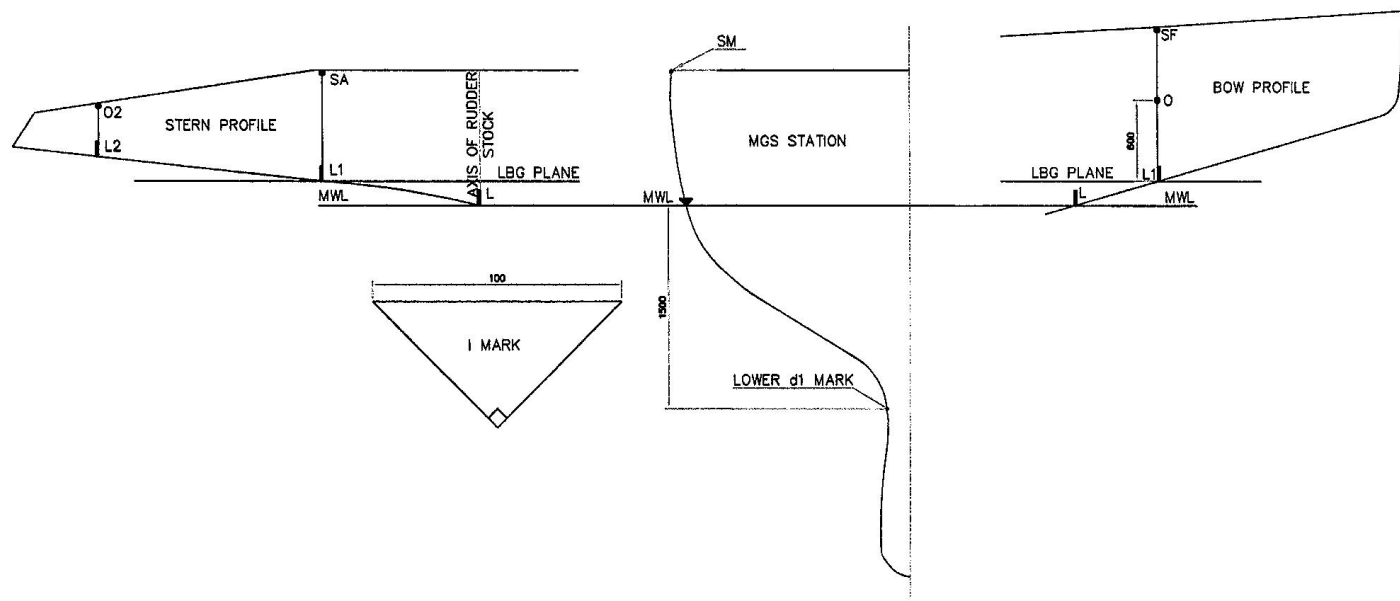


## Appendix B - Measurement Marks

**The following marks shall be placed on the hull. All marks shall be of a contrasting colour to the colour(s) of the yacht.**

No. Req'd	Description	Position
2	Upper length marks, L1	Ends of Measured Length ( <b>LBG</b> )
2	Lower length marks, L	Ends of Waterline Length ( <b>LWL</b> )
2	Immersion marks, IM	On <b>MWL</b> at <b>MGS</b> , (located at 0.55 <b>LWL</b> )
2	Lower midship girth marks, d1	Sides of vessel at 1.500m below <b>MWL</b> at <b>MGS</b>
2	Bow overhang girth marks, O	Sides of forward overhang at 0.600m above forward L1 mark
2	FGS marks, SF	Sheerline above forward L1 mark
2	MGS marks, SM	Sheerline above immersion marks, IM
2	AGS marks, SA	Sheerline above aft L1 mark
1	L2 mark at L2AGS	On stern profile at L2AGS
2	O2 marks at L2AGS	On hull sides vertically above stern outer length mark L2

The length marks, L, L1 and L2, shall be rectangular marks not less than 12mm in width and 150mm in length. All other marks shall be round marks 20mm in diameter, except the immersion mark, IM, which shall be a triangular mark 100mm in length along its top edge and a height of 50mm from its bottom corner, with an included angle at its bottom corner of 90 degrees.



## Appendix B - Measurement Marks

### The marks shall be placed as follows:

- a) The waterline marks, L, at the ends of the waterline. They shall be in the transverse plane, at right angles to the waterline, so that the inner edges of the marks denote the waterline ending (see diagram above) and as close to the centreline of the yacht 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 aft part of the counter. They shall be in the transverse plane at right angles to the centreline (see diagram) and as close to the centreline of the yacht as possible

The marks shall be fixed so that their inner edges are at the following heights above the waterline as follows:

Vertical height of mark L1 above **MWL** – 180mm

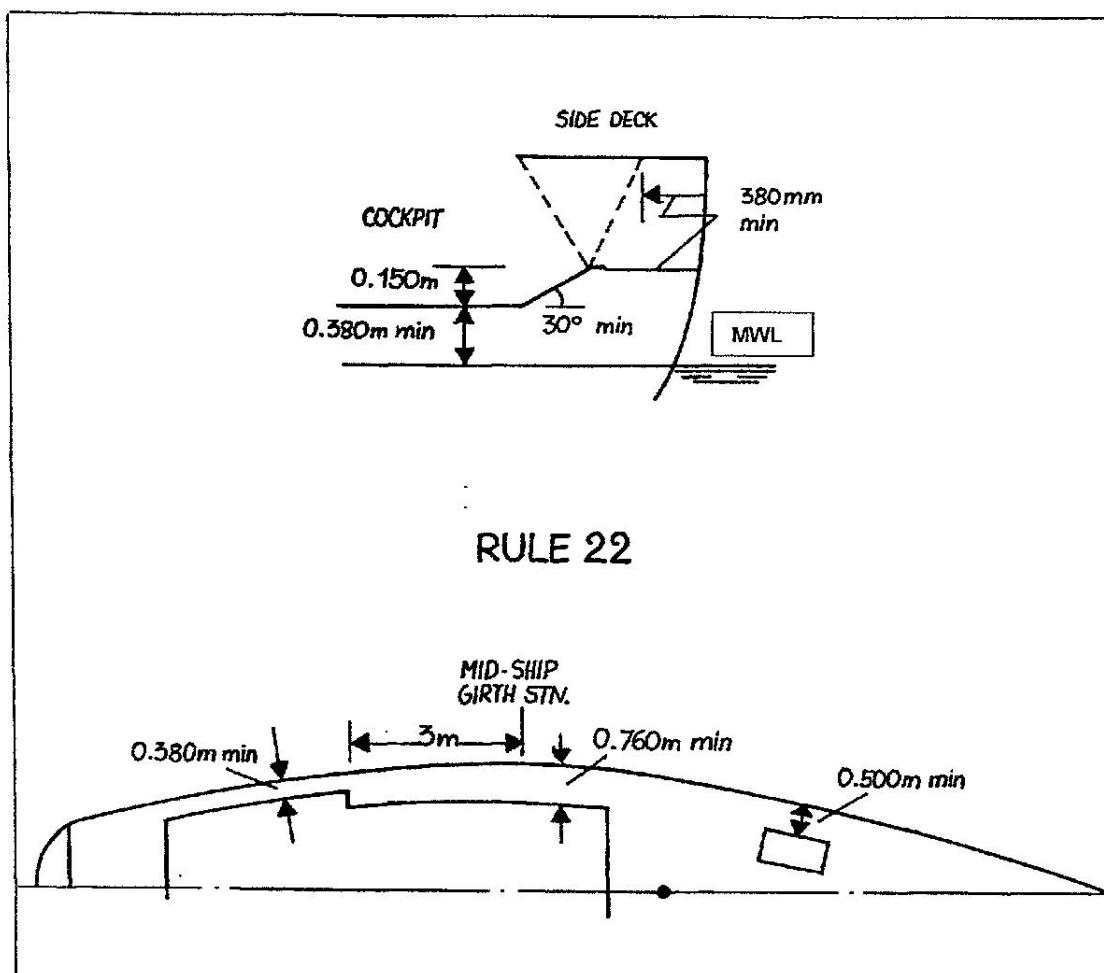
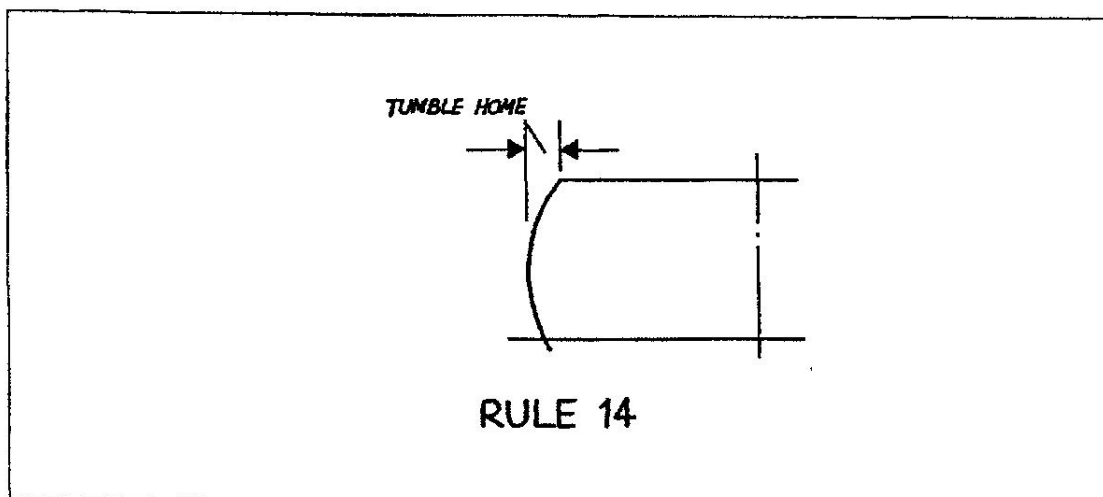
Vertical height of mark L2 above **MWL** – 360mm

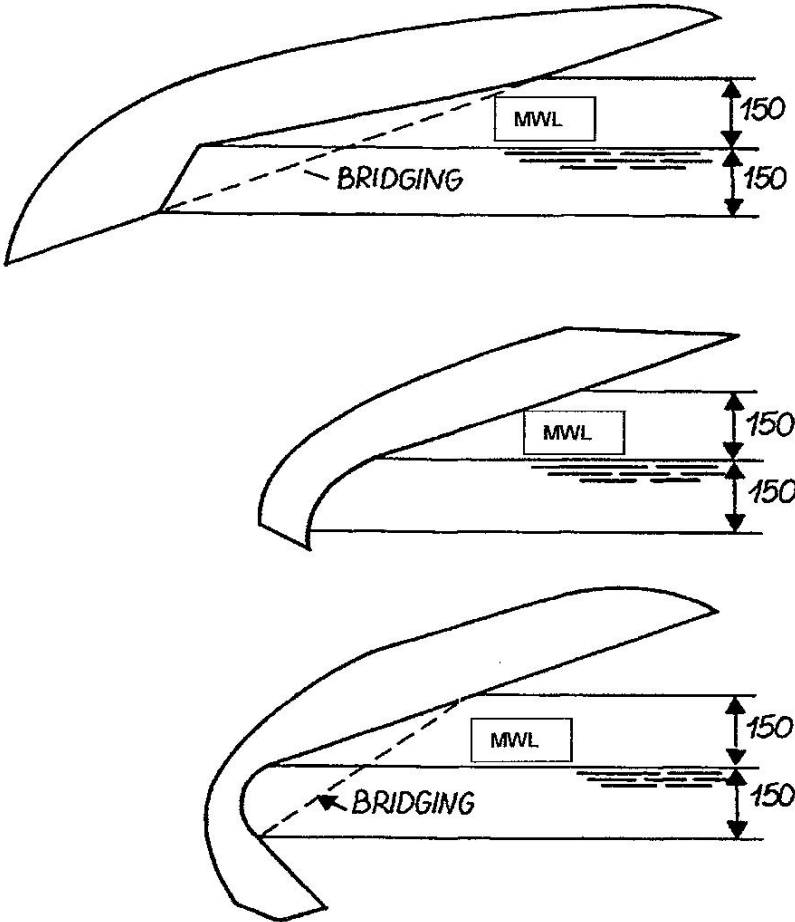
- c) Overhang girth marks O at bow shall be fixed so that their centres shall be vertically above the inner edge of the L1 mark:

Vertical height of bow O mark above L1 – 600mm.

- d) Overhang girth marks SA and outer overhang girth marks O2 at stern close below the **sheerline**, one on each side of the yacht, centres to be vertically above the inner edges of the L1 and L2 marks respectively (see diagram).
- e) Midship girth marks SM on the edge of or close below the **sheerline**, one on each side of the yacht at the **MGS**.
- f) Immersion marks, IM, on both sides of the yacht shall be vertically below the marks SM with the bottom corners just touching the **MWL**.
- g) Lower midship girth marks “d1”, one on each side of the yacht at the point vertically below the centre of the marks SM and IM, so that the three marks shall be situated in the same transverse plane which is perpendicular to the **MWL**. The marks “d1” shall be fixed at a vertical distance of 1500mm below the **MWL**.







STEM PROFILE NEAR MWL

### Age/Design Allowance

#### Preamble

This appendix has been developed to encourage racing of Twelve Metre Class yachts of different eras which may not desire or be able to meet the strict flotation and compliance requirements of the Twelve Metre Class Rule without this Appendix E.

In order to partially account for design development with time and the normal increase in yacht displacement, an Age/Design Correction Factor (ADCF) is applied to Length “L” in the formula in **Class Rule 5**. The ADCF factors are given in Table E-2 below.

Historically, it is found that the displacement of Twelve Metre Class yachts increases with time. This may be due to a number of factors including uptake of water into the planking, additional accommodation, additional equipment including engines and propellers, and additional safety equipment. This is referred to as “natural age sinkage.”

An increase in displacement caused by these factors may prevent a yacht from floating on her original **measurement waterline** without the removal of ballast. If the Twelve Metre **Class Rule** were applied without the ADCF, a yacht with such additional equipment will suffer in rating and sail area. The yacht would have a longer **LWL** and might have a draft penalty and/or a displacement penalty. If the displacement gain were offset by the removal of ballast from the yacht to enable her to float at the original **measurement waterline**, the yacht could have a loss in her ability to carry sail.

With these facts in mind, in 2000 the **ITMA** Technical Committee set out to achieve some method by which an existing, older-style Twelve Metre Class yacht would be permitted to float lower than her original measurement waterline without loss of sail area, and still remain a Twelve Metre Class yacht. As yachts rated by this method will not comply with the main body of the **Class Rule** however, they may be issued with an Appendix E Measurement Certificate. This Certificate will enable the yacht to compete in **ITMA**-endorsed regattas as a Twelve Metre Class yacht.

#### Age Correction to L

The Age/Design Correction Factor (ADCF) shall be applied to “L” as defined in **Class Rule 6.1**. The product of L x ADCF becomes the Length “L” used in the rating formula of **Class Rule 5** and the Length “L” used in the Rating Certificate issued for yachts measured with Appendix E. ADCF is a function of the age of the yacht and the division into which the yacht falls. These divisions are defined below and are broadly age-based but are more specifically based upon underbody configuration. This factor incorporates an element for “natural age sinkage”, from the original measurement waterline.

When the ADCF is applied to “L” in the rating for a yacht with an Appendix E

certificate, the resulting rating credit (if any) may be allocated between increased length and increased sail area as chosen by the Owner to maximize the yacht's competitive performance.

Where this Appendix E is used, no draft or displacement penalty is incurred as a result of "natural age sinkage" and trim. However, this dispensation shall not be further optimized; e.g. intentional sinkage caused by the addition of ballast would be subject to draft and displacement penalties. Attention also is drawn to the requirements of **Class Rule 16** (Hollows), and similar Rule-defining elements shall always apply.

When this Appendix E is used for a yacht with no "natural age sinkage", a yacht's sinkage, trim, and sail area may be adjusted, however any displacement or draft penalty shall apply.

For example, the depth of keel below a fixed hull datum shall not be increased from the yacht's original depth. If the yacht had a draft penalty when first measured, that draft penalty shall still apply. Furthermore, the rudder may not be moved aft to exploit the increased **LWL** from "natural age sinkage"; the displacement of the yacht below a fixed datum, such as the yacht's original **MWL**, may not be reduced; and any displacement penalty when first measured shall still apply.

The overall result of this approach is that an older yacht may float deeper than her original **measurement waterline** but may still be rated as a Twelve Metre Class yacht while retaining a similar sail area to that with which she was first measured.

As long as the components are of a size and weight consistent with equipment fitted to racing yachts of similar size, examples of what are considered the factors for "natural age sinkage" are as follows:

Permitted:

1. Absorption of water in the planking of a wooden **hull**. Absorption of water shall not be a factor for aluminum or GRP **hulls**.
2. Addition of reasonable accommodations in the interior of the yacht consistent with the minimum required under Appendix E-3.
3. Addition of a single propulsion engine with related equipment such as shaft, strut, propeller, cooling and exhaust systems, batteries, fuel tank, controls and instrument panel.
4. Addition of lifelines, stanchions, bow and stern rails, and other safety-related equipment.

Non-exhaustive examples of the factors that are considered to be optimization, and which shall not be considered "natural age sinkage" are as follows:

Not Permitted:

1. Addition of internal or external ballast to increase displacement unless such additional ballast is permitted by the **Class Rule** and subject to any penalties incurred. Addition of ballast for the purpose of making-up any change in weight due to a change of equipment to bring the yacht to its **measurement waterline** is permitted. For example, if a yacht replaces its winches with winches of less weight, the difference in weight may added in ballast to bring the yacht to its **measurement waterline**.
2. Addition of any other equipment in the nature of ballast, regardless of its purpose.
3. The removal of components permitted for “natural age sinkage” while still maintaining the displacement and **MWL** that was achieved by their installation
4. As an exception, a yacht with an engine may remove the running gear exposed to water flow below **MWL** while leaving the engine in place. In such a case, the **MWL** shall be adjusted as advised by the Technical Director.

### **Fleet Age/Design Division**

The development of the Twelve Metre Class is categorised into five distinct divisions as follows:

Division A	Wing Keel (Grand Prix)	Sloops with wing keels and/or constructed after 1983 through 1987 but shall include Australia II (KA 6).
Division B	Skeg-Rudder (Modern)	Sloops without wing keels but with rudders separated from the keel. This corresponds to a period of 1967 to 1983. It shall include Intrepid (US 22) and all yachts built after Intrepid but before Australia II (KA 6) and shall exclude Australia II.
Division C	Keel Hung Rudder (Traditional)	Sloops built from 1950 through 1967 with keel hung rudders, and shall exclude Intrepid (US 22).
Division D	Keel Hung Rudder (Vintage)	Sloops built before 1950.
Division E	Keel Hung Rudder (Antique)	Gaff-headed and Bermuda rigged cutters and sloops built under the First International Rule including yachts with centreboards.

**ITMA** may assign a yacht to a Division different than those given above or may determine an alternative Age/Design Correction Factor (ADCF) in special cases

where:

- a. The construction of the yacht was completed after 1987, or
- b. a yacht built prior to 1987 has been so altered in **hull** form, **appendages**, or accommodation that is no longer consistent with the age date under which it was first constructed, launched, or certificated.

A yacht built to the First or Second International Rule may be measured to that Rule, as requested by the Owner, unless it has been modified to no longer comply with that Rule.

**TABLE E-1**

**Table of Relaxations from Class Rule**

The following tables set out the changes and notes related to each rule in the main part of the **Class Rule**.

Rule	Subject	Alteration and Notes
1	Language	No Change
2	Interpretation	No Change
3	Amendments	No Change
4	Spare	
5	Rating	Length “L” modified by the Age/Design Correction Factor (ADCF).
6 & 7	Length  Midship Girth Difference	No Change. To be measured using the current Measurement Waterline ( <b>MWL</b> ) in measurement condition laid down in <b>Class Rule</b> 48. Yacht may be measured ashore by “flotation range” method. (refer to Appendix F)
8	Freeboard	No Change. To be measured according to the calculation of freeboard “F” applicable at the time of original build, but at current Measurement Waterline ( <b>MWL</b> ) in measurement condition laid down in <b>Class Rule</b> 48. Yacht may be measured ashore by “flotation range” method. (refer to Appendix F)
9	Sail Area	No change but corrected with propeller allowance from <b>Class Rule</b> 10.
10	Propeller Allowance	No Change
11	Draft	Division A: No Change Divisions B, C, D, & E: Shall not incur a draft penalty for “natural age sinkage.” Refer to “Age Correction to L.”
12	Displacement	Division A: No Change Divisions B, C, D, & E: No penalty applicable for insufficient displacement for existing current increased waterline length which results from “natural age sinkage.” If the yacht originally had a displacement penalty she shall continue to carry the same displacement penalty. Refer to “Age Correction to L.”

Rule	Subject	Alteration and Notes
13	Beam	The minimum beam requirements shall only apply to yachts built after the minimum beam requirements were in effect.
14	Tumblehome	No Change
15	Sheer and Sheerline	No Change
16	Hollows	No Change
17	Spare	
18	Construction	Original Lloyd's Class R certificate when the yacht was built is regarded as complying with the construction rules. Current Lloyd's certificate is not required. Repairs and alterations, including weight and weight distribution must be of a standard consistent with original structure of yacht or subsequent approval by Lloyd's. Specific approval for alterations which are not similar to the original construction method or materials shall be sought from the <b>ITMA</b> Technical Director. In reviewing submissions seeking approval of alterations the <b>ITMA</b> Technical Director may request any calculations and drawings he may deem necessary.
19	Appendages	No Change
20	Keel and Other Ballast	No Change, except for Division E yachts originally designed and built with a centreboard, <b>Class Rule</b> 20.3 will permit the centreboard.
21 22 23 & 24	Deck, Cockpits, Hatches and Companionways, Minor Openings	No Change, except if a yacht built prior to 1950 does not comply with the <b>Class Rule</b> it may retain the current <b>deck</b> , cockpit, hatches and companionways provided that sufficient watertight integrity of the <b>hull</b> is ensured, and the minimum cockpit area of 4.6m <sup>2</sup> is deleted.
25	Winch Placement	No Change for Divisions A & B. For Division C, D, and E: may be as per <b>Class Rule</b> when yacht was originally built.
26	Spare	



Rule	Subject	Alteration and Notes	
27	Mast	<p>No Change for Division A &amp; B.</p> <p>For Divisions C, D, and E: existing masts with minor variations in the sectional dimensions and area are permitted.</p> <p>For Divisions C, D, and E the minimum mast weight shall always apply, however, for masts built prior to December 31, 2017 the centre of gravity may be lower than required in Class Rule 27.4 provided the mass moment of inertia is greater than 41000kgm<sup>2</sup>. That is the weight of the mast in kilograms times the height of the centre of gravity in metres above the Mast Datum squared.</p> <p>For Divisions C, D, and E: the mast shall not be moved at the <b>deck</b> while racing.</p>	
28	Boom	<p>No Change, except if the original boom is still fitted, the <b>Class Rules</b> at that time shall be used. For a gaff-rigged Division D or E yacht, this shall include the gaff.</p>	
29	Spinnaker Pole	No Change	
30	Standing Rigging	No Change	
32	Sails	<p>32.1</p> <p>National Letters and Sail Numbers</p> <p>Sail Materials</p>	<p>A Division D or E yacht may be gaff-rigged. Sail numbers and National letters as original are encouraged.</p> <p>Division A &amp; B: No Change</p> <p>Division C, D, &amp; E yachts: Sails to be woven (non-laminated) with maximum fibre modulus of mainsails, jibs, and genoas of not more than 120 grams/denier; or laminated polyester with a maximum fibre modulus of not more than 250 grams/denier.</p>
33	Rated Sail Area	<p>No Change, except that a Division D or E yacht that is not Bermudian-rigged shall have its rated sail area calculated as per the First or Second International Rule, as applicable.</p>	

Rule	Subject	Alteration and Notes	
34	Mainsail	No Change	
35	Genoa, Jib, and Staysail	No Change	
36	Spinnaker	No Change	
37	Gennaker	No change	
38	Spare		
39	Running Rigging, Fittings and Other Equipment	No Change	
40	Crew	Division A Division B,C,D &E	No Change Crew Limit shall be not more than 16 persons
41	Accommodation	Division A and B: No Change Division C, D, & E: Accommodations are required as per the <b>Class Rule</b> in effect appropriate to that Division. See Table E-3 for required accommodations or adjustments.	
42	Applicable Rule, Rule Compliance Owner's Responsibility	No Change	
43	Measurement Certificate	Certificate Endorsed " <b>Appendix E Certificate</b> " where this appendix is used.	
44	Measurers	No Change	
45	Plan Approval and Post Construction Inspection	Not required	
46	Measurement General	No Change	
47	Measurement Marks	No Change. Refer to Appendix B for detailed mark requirements. If a yacht has been measured by the Flotation Range Measurement System, it shall carry a set of range marks for the datum condition as specified in Appendix F.	
48	Measurement Afloat	No Change	

**TABLE E-2**

**Age/Design Correction Factor Table**

Division	Actual Year Built	Age/Design Correction Factor (ADCF)
A	After 1983	1.00
B	1983	0.99
	Intermediate years by linear interpolation to 3 decimal places	
	1968	0.98
C,D and E	1967	0.97
	1950	0.96
	1939-1950	0.96
	1939	0.96
	1920	0.95
	1907 Bermuda Rig	0.93
	1907 Gaff Rigged	0.92
	Intermediate years by linear interpolation to 4 decimal places	

This Age/Design Correction Factor (ADCF) shall be applied using the most recent date of when the yacht was built or first measured and issued with a measurement certificate.

If the yacht has been modified since she was built or first measured and issued with a measurement certificate the following factors shall be taken into account in determining the appropriate ADCF.

If the canoe body excluding the appendages or shape of the external ballast has been modified the impact on the ADCF shall be 50% as determined in the table below. A **hull** modification shall be deemed to have taken place when the total canoe body surface area below the **LBG** plane is changed by 20% or greater from the original canoe body shape.

If the shape of the **keel** has been modified the impact on the ADCF shall be 50% as determined in the table below. Rudders and trim tabs may be changed without effect on the ADCF.

In the case of alteration, the component alteration ADCF shall be that which

applies at the time of alteration. However, if the alteration was carried out outside the age range in Table E-2 the alteration shall be considered as occurring at the most recent limit of the age range, provided the alteration maintains the characteristic style of the age range.

That is, if a new **keel** (appendage) was added to a 1950 yacht in 1999, the ADCF factor to be used for the **keel (appendage)** alteration shall be that which would apply as if the **keel** alteration was undertaken in 1967.

This methodology is explained using the following example.

A yacht was built or first measured and issued with a measurement certificate in 1970 making her base ADCF = 0.982.

Her **appendages** and shape of external ballast were modified in 1974.

Her **hull** was modified more than the 20% of the canoe body area under the **LBG** plane in 1977.

<b>Alteration</b>	<b>Alteration Date</b>	<b>Component Alteration ADCF</b>	<b>ADCF Component Calculation</b>
Original Certificate	1970		Base ADCF = 0.982
Appendage/ Shape of External Ballast Change	1974	0.984	$(0.984 - 0.982)/2 = 0.001$
Hull altered	1977	0.986	$(0.986 - 0.982)/2 = 0.002$
ADCF			$0.982 + 0.001 + 0.002 = 0.985$

**TABLE E-3****Class Rule Accommodation Requirements for Divisions C, D, & E****Preamble**

Prior to a change in the Twelve Metre Class Rule in 1971, all Twelve Metre yachts were required to be constructed with minimum cabin accommodations. Yachts desiring to continue racing in Divisions C, D, and E are expected to meet these minimum requirements, or if some or all of these accommodations have been removed, to accept an adjustment.

For background, the following is an extract from the Third International Rule for Twelve Metre yachts. This extract sets forth the minimum pre-1971 requirements.

21. *TABLE OF CABIN FITTINGS AND CABIN DIMENSIONS  
ARRANGEMENT BELOW DECKS*

*Rules for cabin dimensions, specifications and the fittings of yachts of the International Twelve Metre class. All yachts must be fitted below decks with ordinary fittings of a yacht, efficiently constructed, which in number and size should not be less than specified in the following table and description.*

<b>Structural arrangements</b>	<i>Maximum height of cabin.</i>	<i>2.00m. (6.56ft.)</i>	<i>The maximum height is to be measured from cabin floor to underside of main deck beams, in the case of yachts first measured after 14<sup>th</sup> September 1938.</i>
	<i>Least height of cabin.</i>	<i>1.70m. (5.58ft.)</i>	<i>The least height of the deck is to be measured to the underside of the deck.</i>
	<i>Least breadth of floor at the broadest part.</i>	<i>1.0m. (3.28ft.)</i>	<i>The breadth of the floor is to be measured to the inside of the vessel's skin, at the level of the floor line for the purposes of measurement.</i>
	<i>Bulkheads - Least thickness for wooden bulkheads based on wood of 27 lb./cu.ft.</i>	<i>15mm. (.59in.)</i>	<i>The various cabins are to be separated from each other and from the fore part of the vessel by wooden (or steel) bulkheads. Openings in the bulkheads must be fitted with doors.</i>
	<i>Fixed skylights and hatch for the forecabin must be supplied to all yachts.</i>		<i>All boats must be decked. All openings in the deck except cockpits must be covered with hatch covers, or skylights.*</i>

<b>Furniture</b>	Berths	3 sleeping or sofa berths in the cabins.	Sleeping berths and sofa berths should have fronts with lockers or drawers under, sofa berths should have cushion backs, conveniently constructed with the following minimum dimensions: 188.75 x 51.5cm. (6.25 x 1.75ft.).
	Tables	1 - 0.45sq.m. (4.84sq. ft.).	The table may be of the folding description. A centreboard yacht need not carry a swing table.
	Cupboards and their total capacity.	2 – 0.20cbm. (7.06cu.ft.).	One of which for clothes and linen.
	Total capacity of the cupboards, shelves and compartments in the sideboard.	0.50cbm. (17.66cu. ft.).	
<b>Other fittings</b>	Washstands	1	
	W.C.	1 – underwater or holding tank pump closet.	To be in a separate compartment. The W.C. must be worked with a pump and fitted with the usual plumbing appurtenances suitable for a yacht of the size.
	Water tanks	1 or more. Capacity of not less than 115 litres (25.3 gals.) and not more than 125 litres (27.5 gallons).	When the yacht is submitted to measurement, the water tank(s) must be filled.

#### NOTES:

The “height of cabin” is measured from the floorline for the purpose of measurement. This “height of cabin” must be maintained over a distance of at least one-fourth the length of the yacht on the line of floatation (for boats first registered after 15<sup>th</sup> November, 1958). The increased heights under companions, or other deck erections, are not taken into account in the measuring of the “height of cabin”. The roundup (crown) in the deck must not exceed one-twentieth of the greatest beam of the yacht.

The area of deck openings other than skylights and hatches shall not exceed 5.6 square metres (60 square feet). No cockpit or deck opening other than skylights or hatches shall extend further forward than 12 feet abaft the 55 per cent girth station. (For boats first registered after 15<sup>th</sup> November, 1958).

Suitable hatches and skylights are to be fitted to every cabin which extends across the yacht. Such hatches or skylights are to have clear deck openings of not less than 4 per cent of the

deck area of their cabins.

The hatches or skylights are to be efficiently made in compliance with the Rules (Lloyd's), Sections 40 and 66.

A fixed companion with sliding cover or other means of closing it, to be fitted, and a ladder or stairway, which may be hinged or pivoted, but must not be totally displaced when racing. Should a hatch be fitted over a cabin, it shall be regarded as equivalent to a skylight. In all cabins the side of the vessels above the fittings to be lined, either close, or if with battens, the space not to exceed 25 per cent of the whole. Textile fabrics may be used for lining if fitted in wooden frames. During a race the platforms shall be kept down, bulkheads standing, and ladders and stairways in place, and all the other fittings specified in the Table of Cabin Fittings retained on board. No water may be started from or taken into the tanks, and the anchors and chains specified in the "Lloyd's Rules for the Building and Classification of the International TWELVE METRE Yachts" must be on board, all ballast must be properly stowed under the platforms or in lockers, and no ballast or other dead weights may be used as shifting ballast, or for altering the trim of a yacht.

\*Any opening between the cockpit and the interior of the yacht must be efficiently closed.

End of Extract

### **Accommodation Arrangements Deficiency Table**

With reference to Table 21 of the Third Rule in the Preamble above, the following sets forth the adjustments required by this Appendix E in the event that required accommodations are missing or incomplete.

This calculation shall be applied to all Twelve Metre Class yachts of Divisions C, D & E built before 1971. No allowance shall be made for accommodation arrangements in excess of those set out below. The Measurer is to make an assessment of each item in the list below and make a judgement of the percentage of compliance for that item. The Measurer will then calculate the overall compliance, and shall require the compensation ballast to be fitted at the positions nominated below.

	Estimated Weight in kgs	Compliance Percentage %	Non-compliant weight in kgs
<b>Structural Arrangements</b>			
Three bulkheads (>15mm thickness) fitted with doors	140		
<b>Furniture</b>			
Three (3) sleeping berths, securely fitted bedstead, at least 180x45cm	125		
Three (3) crew sleeping places, pipe cots or similar	40		
One (1) 0.45m <sup>2</sup> table, may be of folding type	20		
Two (2) cupboards one of which for clothes and linen, total capacity 0.2m <sup>3</sup>	20		
Cupboard, shelves and compartments in sideboards, total capacity 0.5m <sup>3</sup>	40		
<b>Other Fittings</b>			
One wash hand stand	35		
One underwater pump closet enclosed by bulkheads	100		
One cooking apparatus for a crew of 6	5		
Water vessel with a capacity of 115 litres	45		

Not less than 115 litres of water and/or fuel in total - carried in their respective tanks	115		
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<b>TOTAL</b> in kilograms	<b>685</b>		
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Deficiency in Accommodation Arrangements in Kilograms			
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Any deficiency is to be rectified by dividing the deficiency into two equal parcels of ballast. One parcel is to be placed inside the hull forward of the FGS, and the other inside the hull aft of the AGS.



**Flotation Range Measurement**

**Instructions & Markings**

Note: If Flotation Range Measurement is used, it must be so noted on the Measurement Certificate.

**Preamble**

Range measurement is a method by which a single on-shore measurement can be applied to variations in a yacht's MWL flotation due to uncertainty about the freeboards or to permit a change in freeboards without requiring full re-measurement of the hull.

**Methodology**

The Range Measurement process involves the yacht be measured at a waterline close to the estimated or scum line indicated waterline. The hull is fully measured ashore to an initial, targeted flotation, referred to as the Range Datum. The measurements applicable to FGS, MGS and AGS are repeated at parallel waterlines above and below the Datum MWL. The vertical spacing of the +/- range waterlines is at the discretion of the measurer but would not normally exceed 60mm. Two additional d1 points on each side of the vessel at the MGS are to be inserted, spaced vertically at half the heights of the main Range spacing. This produces 5 values of skin girths and chain girths. The data from the above and below waterlines would normally be delta data from the indicated waterline.

This interpolation is used to determine the necessary lengths, girths, draft and freeboards. Linear interpolation would normally be used; however, at the discretion of the measurer, in the case of the midship girth difference, a polynomial interpolation may be more appropriate using the five sets of closer spaced d1 points. Any certificate issued using Range Measurement shall be annotated as a "Range Measurement Certificate". All the range measurement data collected by the measurer shall be retained by the measurer and provided to **ITMA** upon request.

Freeboards for the actual measurement afloat are to be taken at the Datum girth stations. Interpolated values of all relevant, actual certificate data are derived from the sets of Range measurements at the three waterlines, using spreadsheet calculations that have been approved by the **ITMA Technical Director**. Such interpolated certificate data includes lengths, girths, draft, and freeboards corresponding to the actual **MWL**.

Attention is drawn to the requirements of **Class Rule 16** (Hollows) and similar Rule-defining elements shall always apply.

After actual freeboards are measured, the bands at the corresponding ends of the LBG and MWL, and the Immersion triangles, IM, shall be located by interpolation and marked as specified in Appendix B using a colour that contrasts from the Datum marks.

Any marks on the hull used for Range Measurement shall be 20mm diamonds in height and of a colour so as not to be confused with the marks required in Appendix B.

In light of further experience using this Appendix F, ITMA may issue further interpretations on implementation of this Appendix and the marking of yachts.