INTERNATIONAL 'A' CLASS

FORMULA AND RATING RULES

(Subject also to the Sailing Rules & General Rating Regulations)

INTRODUCTION

In 1922 the proprietors of the British Magazine YACHTING MONTHLY offered a Challenge Cup for International Competition with the object of encouraging the use of sailing models as a means of testing full scale design.
The Rating Rule under which the yachts were to be built tc race for the Trophy, was devised by Major M. Heckstall-Smith, the Editor of "Yachting Monthly" at that period.
The class was originally known as the "Yachting Monthly 6-Metre", because the rule was intended to produce yachts similar to the International 6-Metre on the scale of 2 inches = 1 foot. Some limits are even directly scaled down from that rule.
The class was adopted by the M. Y. A. and the I. M. Y. R. U., and was later renamed the "International 'A' Class".

SECTION A

RATING FORMULA AND DEFINITIONS

The Class shall consist of Yachts not exceeding 1 metre (39.37 inches) by the following formula:

$$\frac{L + \sqrt{S}}{4} + \frac{L\sqrt{S}}{12\sqrt[3]{D}} = \text{Rating}$$

Where L = Load Water Line Length plus 1/2 any excess in Quarter Beam Measurement.

$\sqrt{S}$ = The square root of the measured Sail Area (See Section D).

$\sqrt[3]{D}$ = The cube root of the Displacement of the yacht, in full racing trim with largest suit of sails, including spinnaker.

LOAD WATER LINE LENGTH (L. W. L.) is the distance in a straight line between the points forward and aft in the plane of flotation in full racing trim, including any part of the rudder (centered) which cuts the waterline plane.

LOAD WATER LINE BEAM is the extreme breadth in the plane of flotation.

QUARTER BEAM MEASUREMENT is the Quarter Beam Length (Q. B. L.) measured in a line parallel with the centre line of the hull, at a distance from it equal to one-quarter of the Load Water Line Beam, and one-tenth of the L. W. L. Beam above the L. W. L. (See Fig. 1.).

EXCESS OF QUARTER BEAM MEASUREMENT is the amount by which the Q. B. L. exceeds the length allowed without penalty. This length is equal to a percentage of the L. W. L. length found by subtracting the square root of one-fifth of the L. W. L. length, in centimetres, from 100 (The square root of half the L. W. L. length, in inches).

Percentage = $100 - \sqrt{1/5\ \text{L. W. L.}}$ ($100 - \sqrt{1/2\ \text{L. W. L.}}$ in inches)

DISPLACEMENT in cubic centimetres is the weight of the yacht in kilograms multiplied by 1000 (D in cubic inches is the weight in lb. (pounds avoirdupois) multiplied by 27.7).

SECTION B

UNITS OF MEASUREMENT

The Rating Formula is applicable to Metric as well as Imperial measures, both of which are indicated in the rules.
Yachts shall be measured in fresh water.
All measurements shall be taken and recorded as follows:-

METRIC

Linear: Centimetres (cm) to one place of decimals.
1 metre = 100 centimetres = 1000 millimetres.

Areas: Square centimetres (cm^2).

Displacement: Cubic centimetres (cm^3). $\sqrt[3]{D}$ to be recorded to two places of decimals.

Weight: Kilograms (kg) to three places of decimals

IMPERIAL

Linear: Inches and decimal fractions of an inch.

Areas: Square inches and decimal fractions of a square inch.

Displacement: Cubic inches and decimal fractions of a cubic inch.

Weight: Pounds (lb.) avoirdupois and decimal fractions of a pound.

All decimals beyond second place to be disregarded except for the weight and displacement.

CONVERSION FIGURES

1 cm	= 0.394 inch	1 inch	= 2.54 cm
1 cm^2	= 0.155 sq. in.	1 sq. in.	= 6.45 cm^2
1 cm^3	= 0.061 cub. in.	1 cub. in.	= 16.387 cm^3
1 kg	= 2.205 lb.	1 lb.	= 0.454 kg

SECTION C

LIMITS AND PENALTIES

1. DISPLACEMENT

Displacement is unlimited, with the following provisos:-

a) The cube root of the displacement ($\sqrt[3]{D}$) as used in the formula must not exceed one-fifth of the L. W. L. (in cm) + 2.5 (one-fifth of the L. W. L. (in inches) + 1).

b) If the $\sqrt[3]{D}$ is less than one-fifth of the L. W. L. (in cm) + 1 (one-fifth of the L. W. L. (in inches) + 0.4), then the difference, up to the value of $\sqrt[3]{D}$, must be deducted from $\sqrt[3]{D}$ to obtain the correct displacement figure for use in the formula, thus involving a penalty for being less than the minimum diplacement allowed.

2. DRAUGHT

The maximum draught shall not exceed 16% of L. W. L. + 8.9 cm (3. 5 inches). Any excess in draught shall be multiplied by 3 and added to rating.

3. FREEBOARD

Average freeboard (taken at centre and at forward and after ends of L. W. L.) shall not be less than:-

$$28\% \text{ of } \sqrt[3]{D} + 2.3 \text{ cm (0.9 inch)}$$

The actual $\sqrt[3]{D}$ is used in this formula (refers to rule 1 b). Freeboard shall be defined as the height above L. W. L. of the junction between upper side of deck and hull. This shall at each station of measurement be determined as the lowest point of contact between the hull and a tangent of 45° to horizontal plane. Rail, fender, or other projections not to be included (See Fig. 2). Any deficit in freeboard shall be added to rating.

4. SHEER

Sheer shall be a fair continuous concave curve.

5. NOTCHES OR HOLLOWS

Any yacht having local notches or hollows in the profile, intended to reduce, or having the effect of reducing the length for measurement, shall be refused a certificate.

6. PROJECTIONS

If any part of the hull below L. W. L. (except the rudder) projects beyond the extremities of the L. W. L. , such projections shall be added to the measured length.

7. CAMBER OF DECK

The camber of deck must not exceed one-twentyfourth (1/24) of the beam at any point.

8. PROHIBITED

Centre-boards, lee-boards, bilge-boards, outriggers, and similar contrivances, as well as prognathous keels, i. e. keels having any part of the leading edge or forward point projecting forward of any part of the leading edge above.

9. SCANTLINGS

There are no restrictions as to scantlings or materials.

10. HEIGHT OF SAIL PLAN

No part of any sail (headboard excepted) or mast if measured as sail area (3 mm (1/8 inch) protrusion for black band allowed) shall exceed 216. 7 cm (85. 3 inches) above deck.

11. HEIGHT OF FORE TRIANGLE

The intersection between the foreside of the jib stay and the mast shall not be higher than 162. 5 cm (64 inches) above deck.

12. MAINSAIL

The triangular mainsail is bounded by after side of mast, upper side of boom, the leech, and the headboard.

a) Headboard
The greatest extension of the headboard from the after side of the mast is 2.5 cm (0.98 inch).

b) Roach

The roach of the mainsail measured at right angles to a straight line from the inner edge of headboard to the clew shall not exceed 10.2 cm (4 inches).
The leech between the upper batten and the after corner of the headboard, and lower batten and clew, shall not lie more than 1 cm (0.4 inch) outside a straight line between these points.

c) Batten Limits

The number of battens in the leech of the mainsail shall not exceed four, and they shall be approximately equally spaced. Intermediate battens shall be no longer than 20 cm (7.87 inches), and top and bottom battens 15 cm (5.90 inches).

d) Foot

The rounded foot of a loose-footed mainsail is not measured, but it is restricted to 2.5 cm (1 inch) outside a straight line from tack to clew.
Part of sail in a groove in the mainboom is not measured either.

13. HEADSAIL

The headsail or jib set in the fore triangle is not measured for area, but the roach measured at right angles to a straight line from head to clew shall not exceed 5.1 cm (2 inches).
A boom is allowed for the jib, but it shall not extend aft of the fore-side of the mast. There are no restrictions on length and number of battens in the jib.

14. REACHING OR GENOA JIBS

These headsails, which extend aft of the mast, shall not measure more than twice the base J of the fore triangle along the foot. No boom is allowed along the foot, nor any battens or other stiffening.

15. SPINNAKER

The lengths of luff and leech of the spinnaker, measured from head to tack and clew respectively, shall each not exceed the measured height I of the fore triangle. The maximum width of half the sail, when folded luff to leech, must not exceed the base J of the fore triangle plus 7.6 cm (3 inches). Measurements to be taken with the sail laid out flat with tension adequate to remove wrinkles.
A spinnaker may have a headboard no wider than one-twentieth (1/20) of the J measurement, but no battens or other stiffening or any device capable of altering its three-cornered shape. The spinnaker shall not be hoisted above the measured height I of the fore triangle.

16. SPINNAKER BOOM

The maximum distance between the centre line of the mast (axis of rotating mast) and the outer end of the spinnaker boom, including tack fitting, shall not exceed the base J of the fore triangle.

17. MAST AND BOOMS

a) A fixed mast (i. e. non-rotating) and without revolving fairings shall not be measured for area. But if a mast can rotate, whether round or of any other section, it is considered to add to the driving area of the mainsail and shall be measured (See Section D, 1.).

b) The mainboom shall nowhere be deeper or wider than 2.5 cm (1 inch).

c) The boom for the jib is restricted only as mentioned under 13.

d) Hollow masts and booms are allowed.

e) Yachts must always sail with mast and mainboom as measured.

SECTION D

SAIL AREA MEASUREMENT

The sail area S for the formula is the measured area of the mainsail, plus any additional area gained by curved edges and rotating mast, plus 85% of the area of the fore triangle (See Fig. 3).

1. MAINSAIL

A. Luff, measured from top of boom (upper edge of black mark) to the lower edge of black mark, indicating sail plan height, beyond which the bottom of the headboard shall not be hoisted. The mainsail luff shall never exceed these marks. Where no headboard is fitted, luff to be measured to upper edge of sail.

B. Breadth, measured from the forward edge of black mark on the mainboom, beyond which the sail may not be extended, to the nearest point at the after side of the mast excluding track or jackstay, but if there is a groove in the mast for the sail, to the foreside of the sail (applies to non-rotating mast only).

Additional Areas due to permanently bent, or curved mast or boom (when the sail is laced to the boom), or pocket-luff mainsail, or total side profile area of mast (See Section C, 17 a), shall be computed and added to the area of the mainsail. Areas bounded by curved edges to be calculated as the base O multiplied by 2/3 of the perpendicular P. (See Fig. 4).

2. FORE TRIANGLE

I. Height, measured from the deck up the foreside of the mast to the lower edge of black mark where the foreside of the jib stay cuts the mast.

J. Base, measured from the foreside of the mast to where the foreside of the jib stay, when extended, cuts the deck.

CALCULATION OF SAIL AREA

$$S = \frac{A \times B}{2} + \text{Add. areas} + 85\% \frac{I \times J}{2}$$

SECTION E

DECK AND SPAR MARKS

All points of measurement on deck, mast, and mainboom must be indicated by a black mark or band 3 mm (1/8 inch) wide. On dark coloured deck or spars white marks may be used.

MAST POSITION
The foreside of the mast must be marked on deck, and the distance recorded on the certificate.
The mast may be moved forward or aft not more than 13 mm (1/2 inch) from the marked position, provided limits of movement are marked on deck.

FORE TRIANGLE
The foreside of the jib stay, or its extension, shall be marked on deck. Should the mast be moved, the base J of the fore triangle must be adjusted so that the measured base is not exceeded. Limits of movement of the jib stay must also be marked on deck or equipment, as appropriate.

PLACING OF MARKS

The correct placing of marks is an important and rigid requirement. They must correspond exactly to the mensurements shown on the Rating Certificate and shall be positioned as follows:-

a) On deck, the forward edge of each mark must be placed at the points of measurement.

b) On the mast, the lower edge of the mainsail luff limit mark, also indicating height of sail plan, must be placed at the point of measurement, likewise the fore triangle height limit mark.
A mark is also required on the mast at the gooseneck, with its top edge in line with the top of the mainboom.

c) On the mainboom, the forward edge of the mainsail clew limit mark must be placed at the point of measurement.

SECTION F

DISTINGUISHING MARKS

Each yacht shall carry on the mainsail the Class Mark and Registred Number, as allotted by the National Authority of the Country concerned. It must correspond to the number shown on the Rating Certificate.
In addition, all yachts when racing shall carry their Owners' racing flags, which must be rectangular in shape and approximately 7 x 6 cm (2.75 x 2.50 inches).

SIZES OF MARKS AND NUMBERS

The registration number shall be preceded by the distinguishing National Letter of similar dimensions.

	REG. NUMBER AND NATIONAL LETTER		CLASS MARK A	
	cm	inches	cm	inches
HEIGHT	7.5	3	2.5	1
WIDTH x)	5.0	2	2.0	0.75
THICKNESS	1.3	0.5	0.6	0.75
SPACING (min.)	1.3	0.5		

x) Does not apply to figure 1 and letters I and J.

Bar dividing class mark and number to be 6 mm (1/4 inch) thick.

Example: $\frac{A}{N28}$

NATIONAL LETTERS

B	BELGIUM	KN	NORTHERN IRELAND
D	DENMARK	KS	SCOTLAND
F	FRANCE	KZ	NEW ZEALAND
G	GERMANY	N	NORWAY
H	HOLLAND	OE	AUSTRIA
I	ITALY	S	SWEDEN
J	JAPAN	SA	SOUTH AFRICA
K	GREAT BRITAIN	U	U. S. A.
KA	AUSTRALIA	Y	YUGOSLAVIA
KC	CANADA	Z	SWITZERLAND

APPENDIX

The foregoing Rating Rules apply to Radio Controlled "A" Class yachts in all respects, except that "RA" Class yachts shall at all times sail with radio equipment as measured. Any changes in equipment resulting in a change of rating shall render the Rating Certificate invalid.

The revision of the foregoing rules has been carried out by the I. M. Y. R. U. Sub-Committee in order to clarify certain problems which had arisen, particularly in connection with the appearance of new designs of hulls and sail plans made possible by the new materials available.

The "International 'A' Class" rule, which has now been in existence for 50 years and thereby verified the skill and foresight involved in its elaboration, has been the subject of careful consideration. The necessary amendments have only resulted in a few appendices to the previous edition of the rule, and nothing has been altered in the original intention of the rule.

For reasons of uniformity, measurement in fresh water has been prescribed. Freeboard limit has been altered accordingly.

At the same time, the Metric system has been introduced in the rating rule. Imperial weights & measures have also been shown.

KAI IPSEN

Chairman for the
Internat."A" Class
Sub - Committee.

Copenhagen, February, 1973.

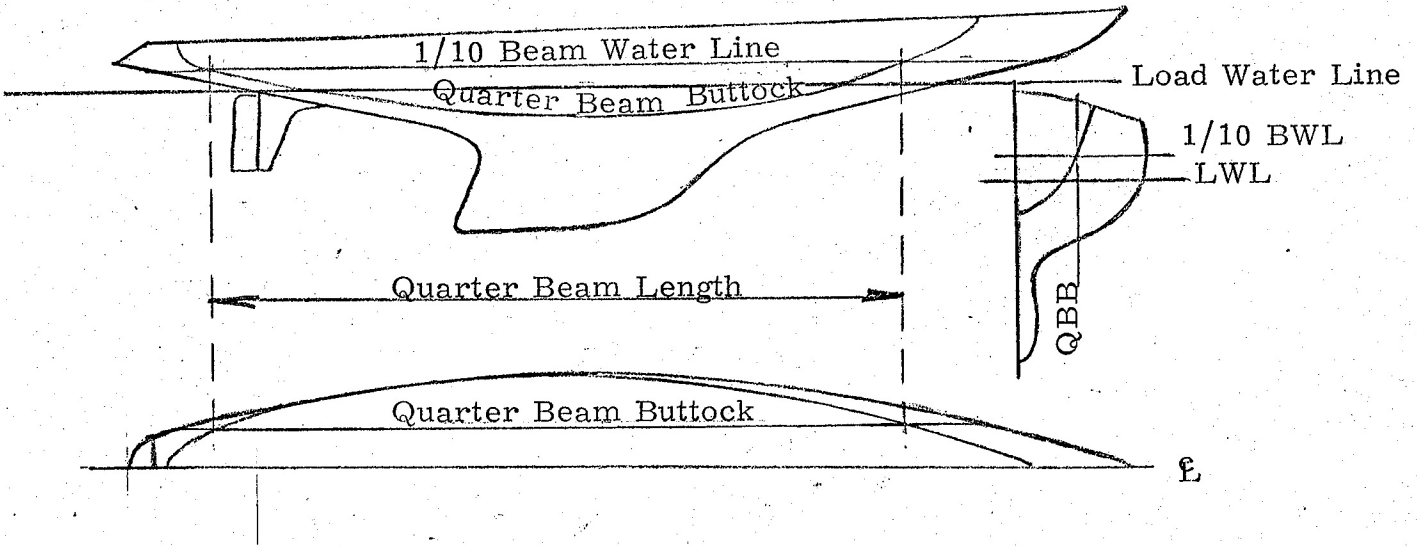


Fig. 1 QUARTER BEAM MEASUREMENT

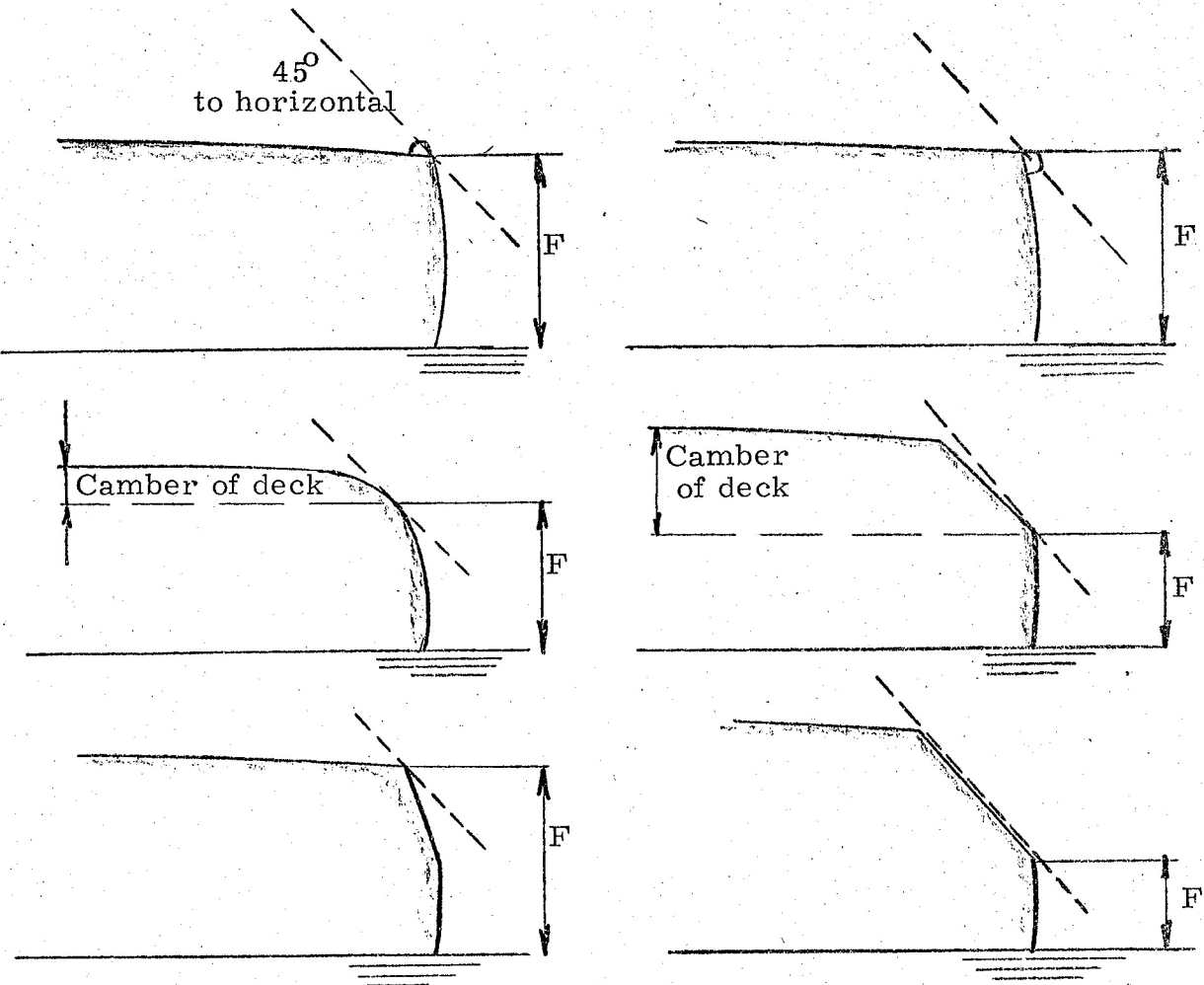


Fig. 2 FREEBOARD

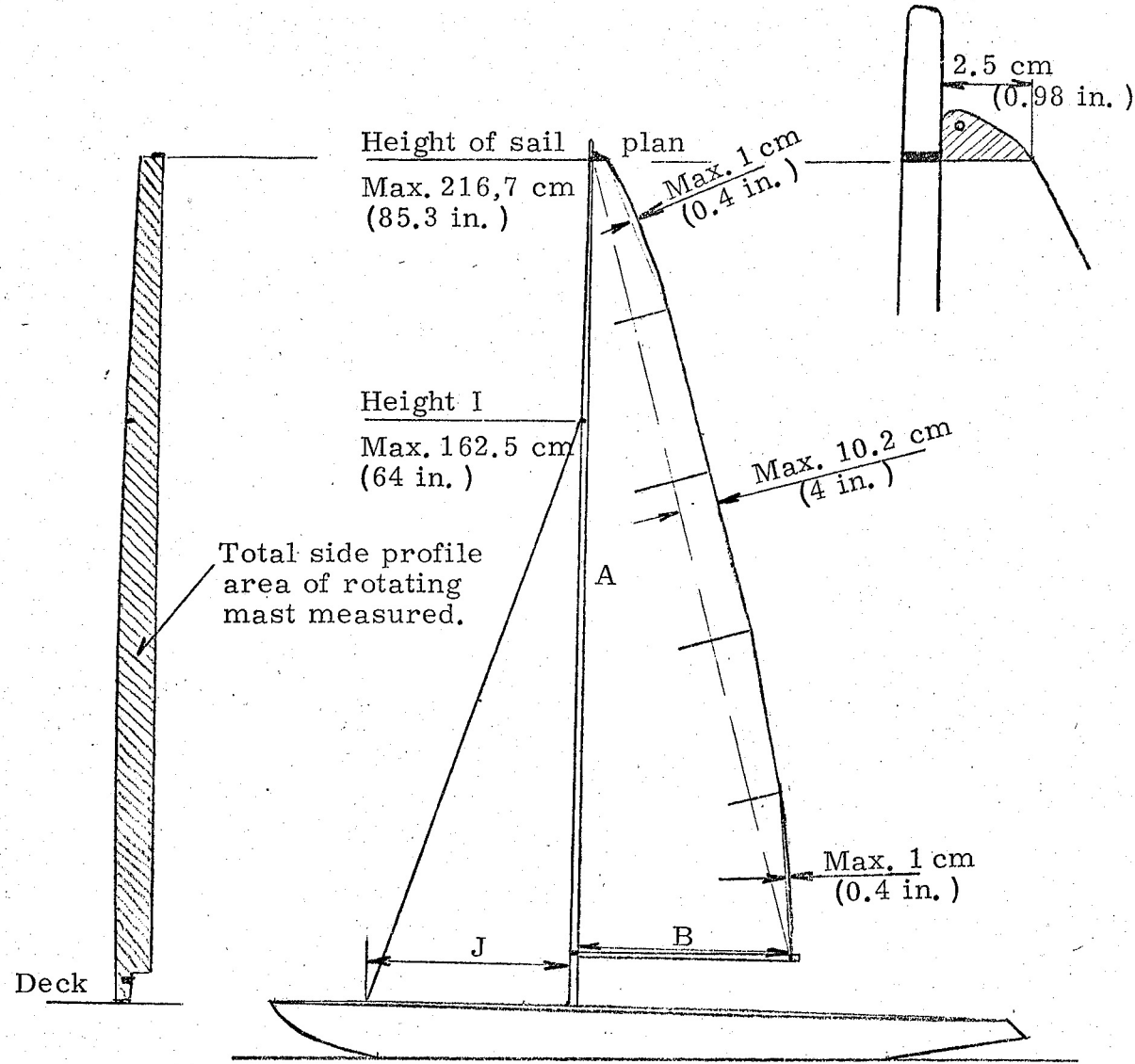


Fig. 3 SAIL AREA MEASUREMENT

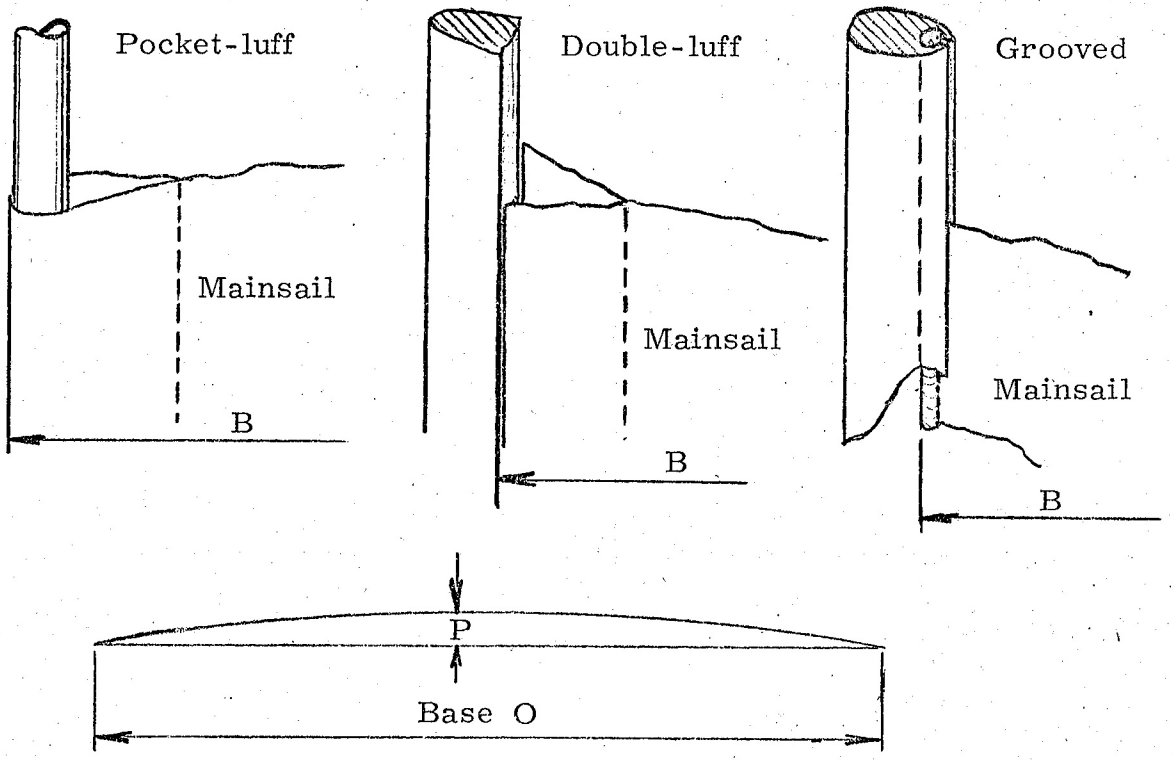


Fig. 4 CURVED EDGES