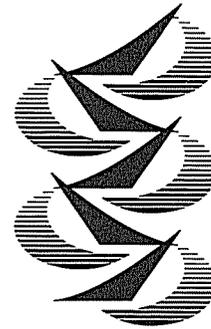


ISAF Equipment Rules of Sailing
for 1997-2000





I S A F

The Equipment Rules of Sailing 1997-2000

Introduction

The International Sailing Federation recognises 56 different classes of boat. Before they race, most classes require that the boat has been issued with a Measurement Certificate as referred to in Rule 78.1 of the Racing Rules of Sailing for 1997-2000.

To obtain such a Certificate necessitates the boat being subjected to measurement as required by the class rules. This is normally carried out by a qualified measurer with the necessary authority to undertake measurement for the class concerned.

This book is primarily intended to assist these Measurers and gives guidance for the more common forms of measurement encountered, particularly sail measurement.

This book may also be of use to manufacturers of boats, sailmakers and class associations.

The origins of the 56 International and ISAF Recognised Classes are as diverse

as their hull forms. The intention of these Equipment rules incorporating guidance to measurers is to provide standard terms and definitions which measurers and manufacturers of equipment can use to ensure consistent results worldwide.

An increasing number of International Classes are amending their class rules to require sails to be made and measured in accordance with the ISAF Equipment Rules of Sailing 1997-2000. In essence these sail rules are the document formally called the IYRU Sail Measurement Rules 1993. It should be noted that a previous document, IYRU Sail Measurement Instructions 1986 has some significant differences from these Equipment Rules. Classes wishing to adopt the new standard will need to survey their current sails to establish the new dimensions to be used with the re-defined measurement points.

The appointment of ISAF International Measurers is carried out by the ISAF on the recommendations of an International Class Association and their Member National Authority.

In the first instance applicants should contact the appropriate International Class Association.

Updated contact details for Member National Authorities and ISAF International & Recognised Classes can be found on the ISAF Internet Website:
<http://www.sailing.org>

I would like to thank the ISAF Standard Class Rules Working Party and in particular Jan Dejmo and Ken Kershaw for the tremendous amount of work devoted to this publication.

Jean-Pierre Marmier
Chairman ISAF Measurement Committee

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ISAF Equipment Rules of Sailing 1997 - 2000

STATUS

The ISAF Equipment Rules of Sailing 1997 - 2000 have no mandatory status except when invoked by Class Rules and/or Sailing Instructions.

FOREWORD

From 1 March 1997 the ISAF Equipment Rules of Sailing 1997-2000 and ISAF Guide to Sail Measurement 1997-2000 will replace the YRU Sail Measurement Rules 1993. The Rules and Guide are the result of several years of analysis and drafting and are the logical extensions of earlier work dating as far back as the YRU Sail Measurement Instructions 1973. The Rules and Guide, together with their appendices, will provide sailors, race organisers, administrators and manufacturers with effective tools with which to implement simpler and better control procedures.

INTRODUCTION

Where a term is used in its defined sense, it is printed in *italic* type if defined in the Racing Rules of Sailing and in **bold** type if defined in the Equipment Rules of Sailing.

Abbreviations

ISAF	International Sailing Federation
NA	ISAF National Authority
ICA	International Class Association
NCA	National Class Association
RRS	The Racing Rules of Sailing
ERS	The Equipment Rules of Sailing

PART I – Use of Equipment

SECTION A – DURING AN EVENT

When there is conflict between the ERS and the RRS during an event, the latter shall take precedence.

SECTION B – WHEN RACING

When there is conflict between the ERS and the RRS when *racing*, the latter shall take precedence.

PART II – Definitions

In Sections C, D, E, F, and G, the defined word means the definitions that follows.

SECTION C – GENERAL DEFINITIONS

C.1 BOAT

The sports equipment used by the crew to take part in a race. It includes the hull, the rig, the sails and all other items of equipment used, excluding personal equipment.

C.2 CLASS RULES

The document that specifies the **boat** in the form in which it may be used for *racing*, including any other document invoked by that document.

C.3 TYPES OF CLASS RULES

C.3.1 Closed class rules:

Class rules where anything not specifically permitted by the **class rules** is prohibited.

C.3.2 Open class rules:

Class rules where anything not specifically prohibited by the **class rules** is permitted.

C.4 TYPES OF MEASUREMENT

C.4.1 Fundamental measurement:

Measurement required by the **class rules**.

C.4.2 Event measurement:

Measurement carried out in accordance with RRS Appendix M 2.2(8).

C.5 TYPES OF MEASURERS

C.5.1 Official measurer:

A measurer appointed, or recognised, by an NA, to carry out **fundamental measurement**.

C.5.2 Event measurer:

A measurer appointed by a race committee in accordance with RRS 78.3.

C.5.3 International measurer:

An **event measurer** appointed by ISAF to assist in measuring at international events and to measure prototypes of moulded production **boats**.

C.6 CERTIFICATION

C.6.1 Certify:

To issue a **certificate**, or to attach a **certificate mark**, after successful **fundamental measurement**.

C.6.2 Certificate:

Documentary proof of successful **fundamental measurement** of the **hull**, or any other parts required by the **class rules** to have a **certificate**, issued by the **certification authority**.

C.6.3 Certification mark:

Proof of successful **fundamental measurement** of parts requiring a **certificate mark**, attached or made by an **official measurer**.

C.6.4 Certification authority:

The ISAF, the NA of the owner of the hull, or their delegates.

SECTION D – HULL DEFINITIONS

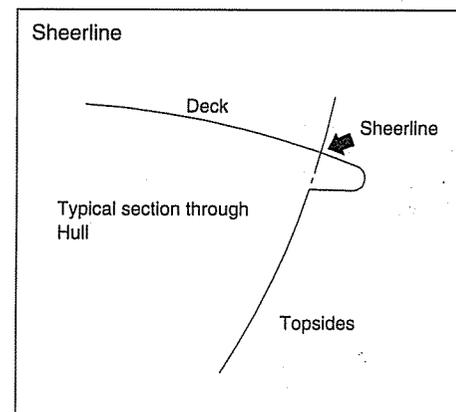
D.1 HULL TERMS

D.1.1 Hull:

The shell, the deck, the internal structure, the **hull appendages**, their fittings and any corrector weights.

D.1.2 Sheerline:

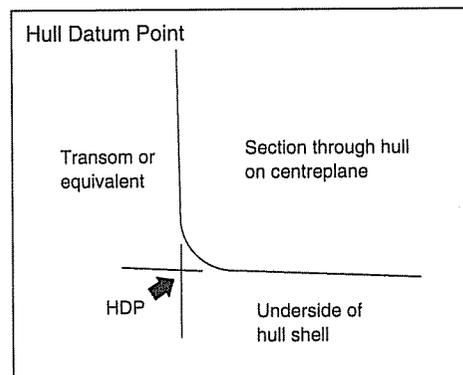
The intersections of the top of the deck and the outside of the **hull shell**, each extended as necessary.



D.2 HULL MEASUREMENT POINTS

D.2.1 Hull datum point:

The intersection, on the centreplane of the hull, between the underside of the shell and the transom or equivalent aftermost structure, each extended as necessary.



SECTION E – HULL APPENDAGE DEFINITIONS

E.1 HULL APPENDAGE TERMS

E.1.1 Hull appendage:

Any item of equipment, including the items listed at E.1.2 to E.1.8, attached to the hull shell, or another hull appendage, used to affect stability, leeway and steerage.

E.1.2 Bilge keel:

A fixed hull appendage, placed off the hull centreplane and below the sheerline.

E.1.3 Bilgeboard:

A retractable hull appendage, non rotating or rotating about an axis more than 45° from the vertical, placed off the hull centreplane and below the sheerline.

E.1.4 Centreboard:

A retractable hull appendage, rotating about a single transverse axis, placed approximately on the hull centreplane and below the sheerline.

E.1.5 Daggerboard:

A retractable hull appendage, non rotating, placed approximately on the hull centreplane and below the sheerline.

E.1.6 Keel:

A fixed hull appendage placed approximately on the hull centreplane and below the sheerline.

E.1.7 Rudder:

A hull appendage, rotating about an axis less than 45° from the vertical, placed on or off the hull centreplane and below the sheerline.

E.1.8 Skeg:

A fixed hull appendage, placed aft of the keel, approximately on the hull centreplane and below the sheerline.

SECTION F – RIG DEFINITIONS

Definitions relating to 'boom' also apply to 'gaff' and 'sprit'. Definitions relating to 'spinnaker pole' also apply to 'whisker pole' and 'jockey pole'. Definitions relating to 'bowsprit' also apply to 'bumpkin'.

F.1 GENERAL RIG TERMS

F.1.1 Rig:

The spars, the rigging and their fittings.

F.1.2 Spar:

The main structural part(s) of the rig, to, or from, which sails are attached and/or supported.

F.1.3 Rigging:

Any equipment attached at one or both ends to spars, sails or other rigging and capable of working in tension only.

F.1.4 Spar band:

A mark on a spar indicating the position limit(s) of an item of equipment.

F.2 SPAR BAND DIMENSIONS

F.2.1 Spar band width:

The minimum width measured in the length direction of the spar.

F.3 FORETRIANGLE DIMENSIONS

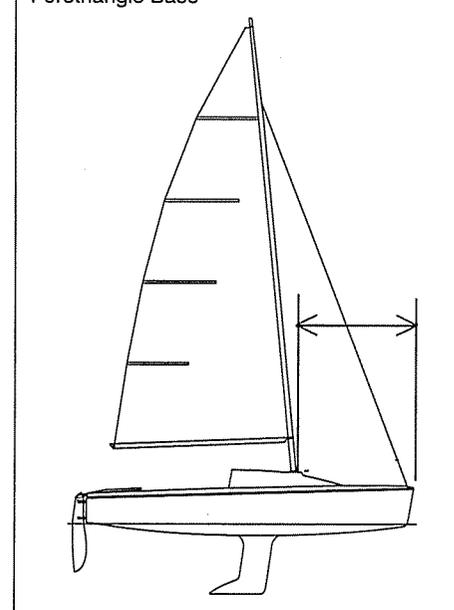
F.3.1 Foretriangle base:

The longitudinal distance between the intersection of the deck and the fore side of the mast spar projected as necessary and the intersection of the deck, or bowsprit spar, and the centreline of the forestay, projected as necessary.

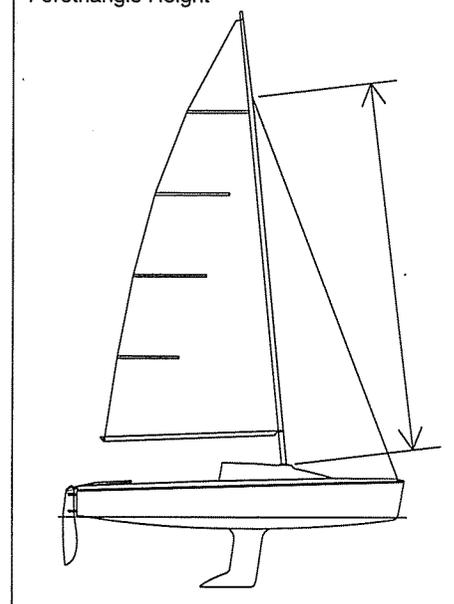
F.3.2 Foretriangle height:

The distance between the intersection of the deck and the mast spar projected as necessary and the intersection of the mast spar and the centreline of the forestay, projected as necessary.

Foretriangle Base



Foretriangle Height



F.4 MAST TERMS

F.4.1 Mast:

The spar, its rigging and fittings, excluding any fittings that are not essential to the function of the mast as part of the rig.

F.5 MAST MEASUREMENT POINTS

F.5.1 Lower point:

The highest point of the lower spar band at the relevant edge of the spar.

F.5.2 Upper point:

The lowest point of the upper spar band at the relevant edge of the spar.

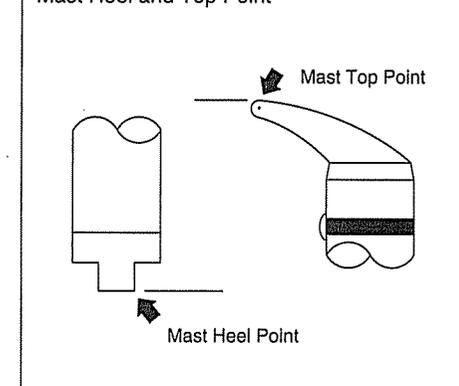
F.5.3 Heel point:

The lowest point of the mast excluding rigging.

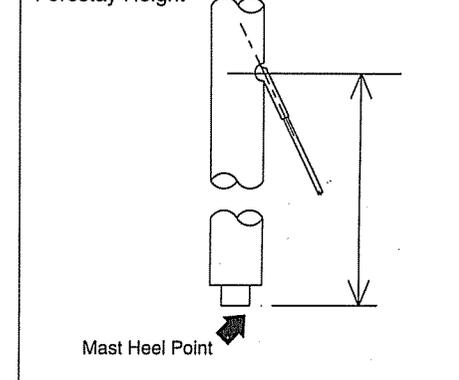
F.5.4 Top point:

The highest point of the mast excluding rigging.

Mast Heel and Top Point



Forestay Height



F.6 MAST DIMENSIONS

F.6.1 Forestay height:

The distance between the **heel point** and the intersection of the **spar** and the centreline of the forestay, projected as necessary.

F.6.2 Lower band height:

The distance between the **heel point** and the **lower point**.

F.6.3 Upper band height:

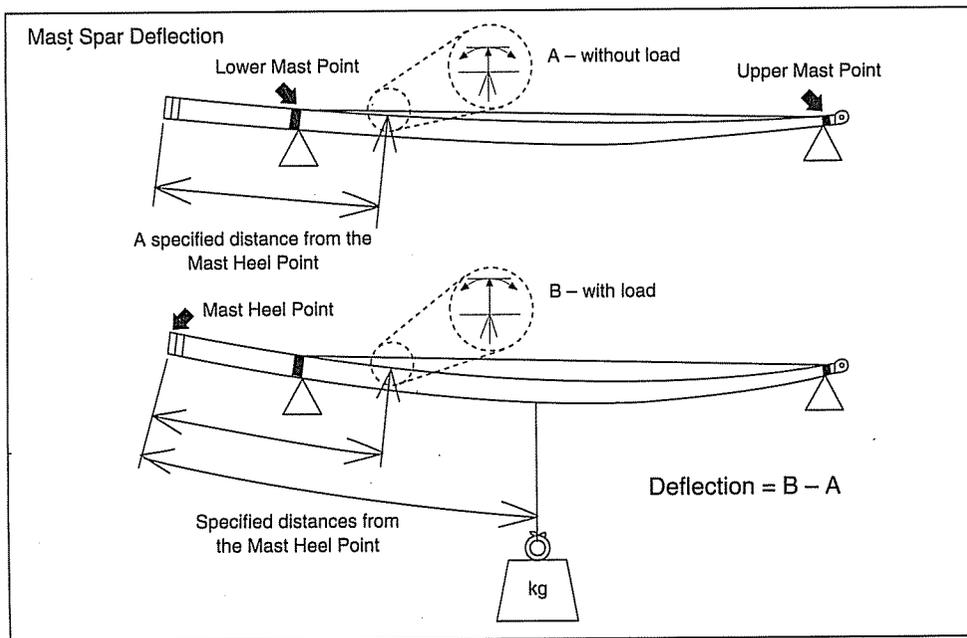
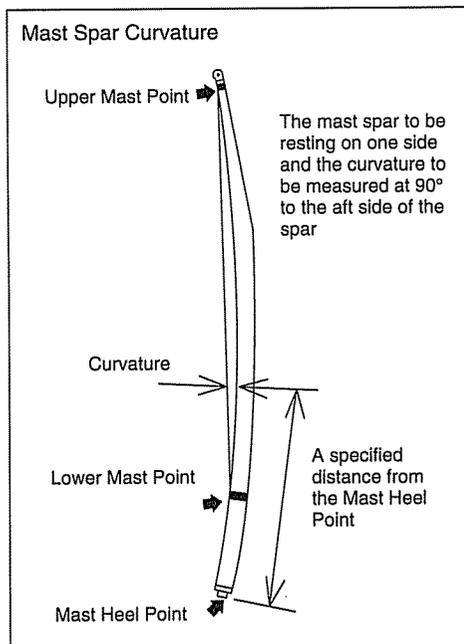
The distance between the **heel point** and the **upper point**.

F.6.4 Mast spar curvature:

The shortest distance between the aft edge of the **spar** and a straight line between the **upper point** and the **lower point** at a specified distance from the **heel point** when the **spar** is resting on one side.

F.6.5 Mast spar deflection:

The difference in the shortest distance between the **spar**, at a specified distance from the **head point**, to a straight line between the **upper point** and the **lower point** when the **spar** is supported horizontally at these points, with and without a specified load at a specified distance from the **heel point**.



(a) **FORE-AND-AFT:** Measured with the aft edge up.

(b) **TRANSVERSE:** Measured with the one side up.

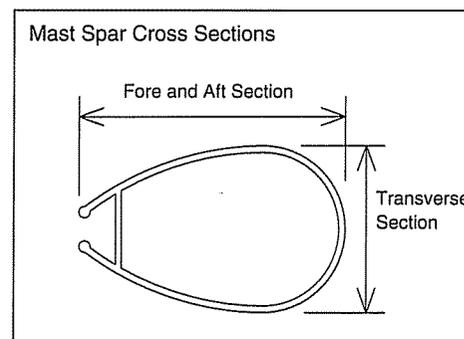
F.6.6 Mast length:

The distance between the **heel point** and the **top point**.

F.6.7 Mast spar cross section:

(a) **FORE-AND-AFT:** The fore-and-aft dimension, including any **sail track**, at a specified distance from the **heel point**.

(b) **TRANSVERSE:** The transverse dimension, at a specified distance from the **heel point**.

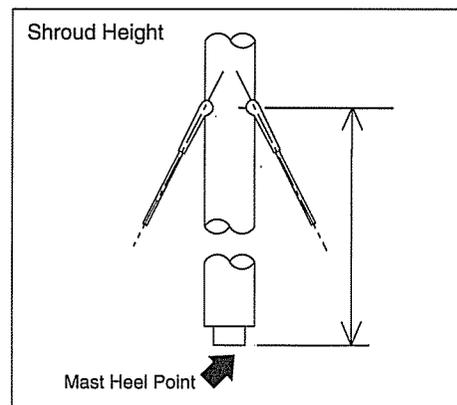


F.6.8 Mast weight:

The weight of the **mast**.

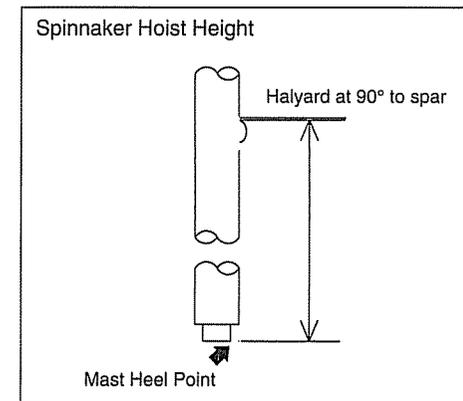
F.6.9 Shroud height:

The distance between the **heel point** and the intersection of the **spar** and the centreline of the shroud, projected as necessary.



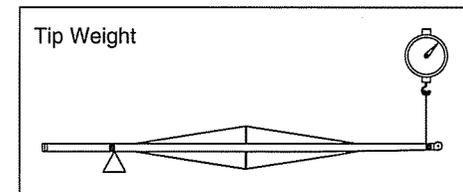
F.6.10 Spinnaker hoist height:

The distance between the **heel point** and the intersection of the **spar** and the lower edge of the spinnaker halyard, when at 90° to the **spar** and projected as necessary.



F.6.11 Tip weight:

The weight of the **mast** measured at the **upper point** when the **spar** is supported at the **lower point**.



F.7 MAST FITTINGS

F.7.1 Spinnaker pole fitting:

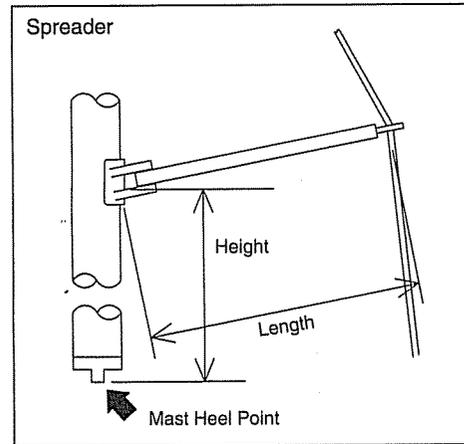
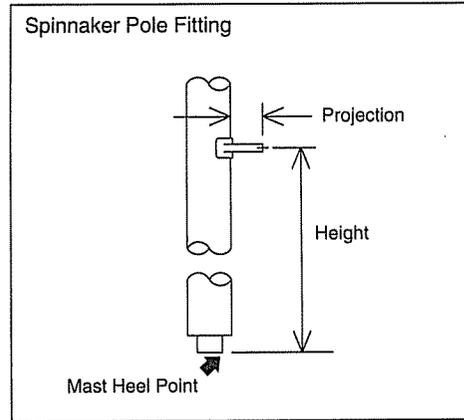
(a) **HEIGHT:** The distance between the **heel point** and the centre of the bearing part of the fitting.

(b) **PROJECTION:** The shortest distance between the outermost point of the fitting and the **spar**.

F.7.2 Spreader:

(a) **LENGTH:** The distance between the inner edge of the shroud at the lower edge of the spreader and the intersection of the lower edge of the spreader, projected as necessary, and the **spar**.

(b) **HEIGHT:** The distance between **heel point** and the intersection of the lower edge of the spreader, projected as necessary, and the **spar**.



F.8 BOOM TERMS

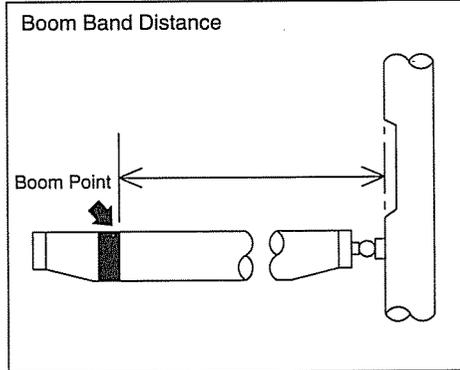
F.8.1 Boom:
The **spar**, its **rigging** and fittings, but excluding sheets, sheet blocks and kicking strap/strut arrangement.

F.9 BOOM MEASUREMENT POINTS

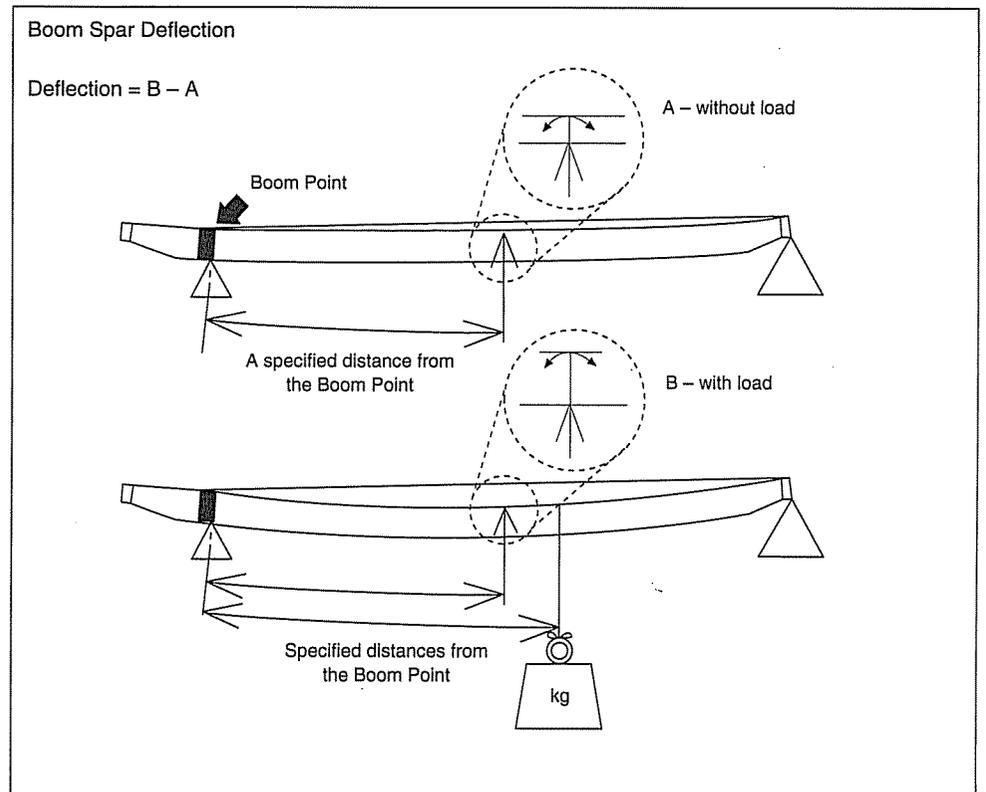
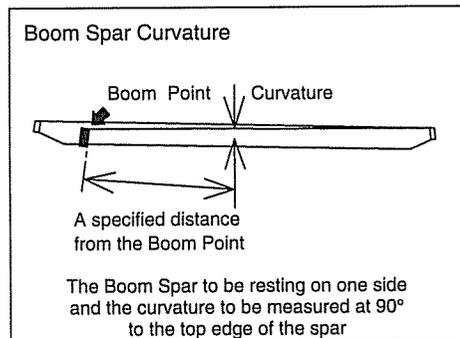
F.9.1 Boom point:
The point on the **spar band**, at the upper edge of the **spar**, nearest the fore end of the **boom**.

F.10 BOOM DIMENSIONS

F.10.1 Boom band distance(s):
The maximum distance between the **boom point** and the aft edge of the **mast spar**, when the **boom spar** is held at 90° to the **mast spar**.



F.10.2 Boom spar curvature:
The shortest distance between the top edge of the **spar** and a straight line between the **boom point** and the top of the fore end of the **spar** at a specified distance from the **boom point**, when the **spar** is resting on one side.



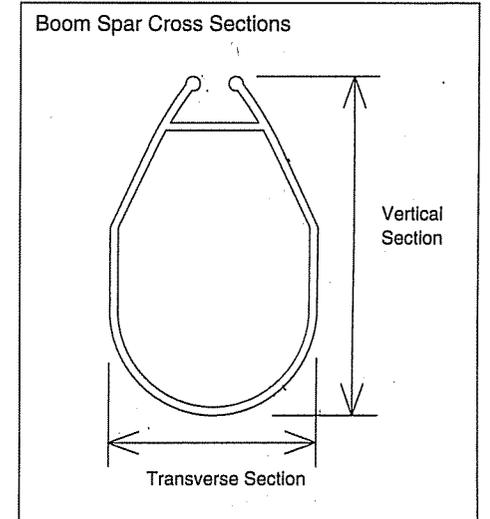
F.10.3 Boom spar deflection:
The difference in the shortest distance between the **spar** at a specified distance from the **boom point** to a straight line between the **boom point** and the top of the fore end of the **spar** when the **spar** is supported horizontally at these points, with and without a specified load at a specified distance from the **boom point**.

- (a) VERTICAL: Measured with the top edge up.
- (b) TRANSVERSE: Measured with one side up.

F.10.4 Boom spar cross section:

- (a) VERTICAL: The vertical dimension, including any **sail track**, at a specified distance from the fore end of the **boom**.
- (b) TRANSVERSE: The transverse dimension at a specified distance from the fore end of the **boom**.

F.10.5 Boom weight:
The weight of the **boom**.



F.11 SPINNAKER POLE TERMS

F.11.1 Spinnaker pole:

The **spar**, its fittings, bridle arrangement(s) and end fitting control lines.

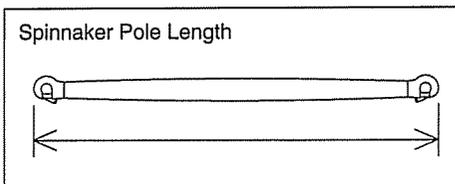
F.12 SPINNAKER POLE DIMENSIONS

F.12.1 Spinnaker pole spar cross section:

The sectional dimensions at specified distances from an end of the **spinnaker pole**.

F.12.2 Spinnaker pole length:

The distance between the ends of the **spinnaker pole**.



F.12.3 Spinnaker pole weight:

The weight of the **spinnaker pole**.

F.13 BOWSPRIT TERMS

F.13.1 Bowsprit:

The **spar** and fittings.

F.14 BOWSPRIT MEASUREMENT POINTS

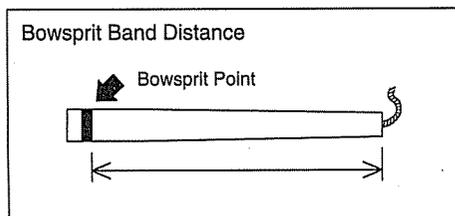
F.14.1 Bowsprit point:

The point on the **spar band** nearest to the outboard end of the **bowsprit**.

F.15 BOWSPRIT DIMENSIONS

F.15.1 Bowsprit band distance:

The distance between the **bowsprit point** and the outboard end of the **bowsprit**.



F.15.2 Bowsprit spar cross section:

The sectional dimensions at specified distances from the outboard end of the **bowsprit**.

F.15.3 Bowsprit weight:

The weight of the **bowsprit**.

**SECTION G – SAIL DEFINITIONS
SUBSECTION A – TRILATERAL SAILS**

Definitions relating to 'mainsail' also apply to 'foresail' and 'mizzen'. Definitions relating to 'headsail' also apply to 'staysail'.

G.1 GENERAL SAIL TERMS

G.1.1 Sail:

An item of equipment attached to the **rig**, used to propel the **boat**.

G.1.2 Body of the sail:

The **sail** excluding added parts such as, **tablings**, **windows**, **batten pockets**, **sail reinforcements**, corner boards, bolt ropes, eyes, cringles, fastenings, identification marks, **certificate marks** and advertising.

G.1.3 Ply:

A sheet of **sail material**.

G.1.4 Woven ply:

A **ply** which, when torn, can be separated into fibres without leaving evidence of a film.

G.1.5 Laminated ply:

A **ply** made up of more than one layer.

G.1.6 Single-ply sail:

A **sail** where all parts of the **body of the sail** consist of only one **ply**.

G.1.7 Double luff sail:

A **sail** with more than one **luff**, or a **sail** passing around a stay or **spar** and attached back on itself.

G.1.8 Soft sail:

A **sail** capable of being folded flat in any direction without damaging the **ply**, except in areas of **primary reinforcement**.

G.1.9 Seam:

Ply overlap(s) where two parts are joined except for **sail reinforcement**, **tabling** and **batten pockets**.

G.1.10 Tabling:

Additional **ply** or folded **ply** overlap(s) at a **sail edge**.

G.1.11 Batten pocket:

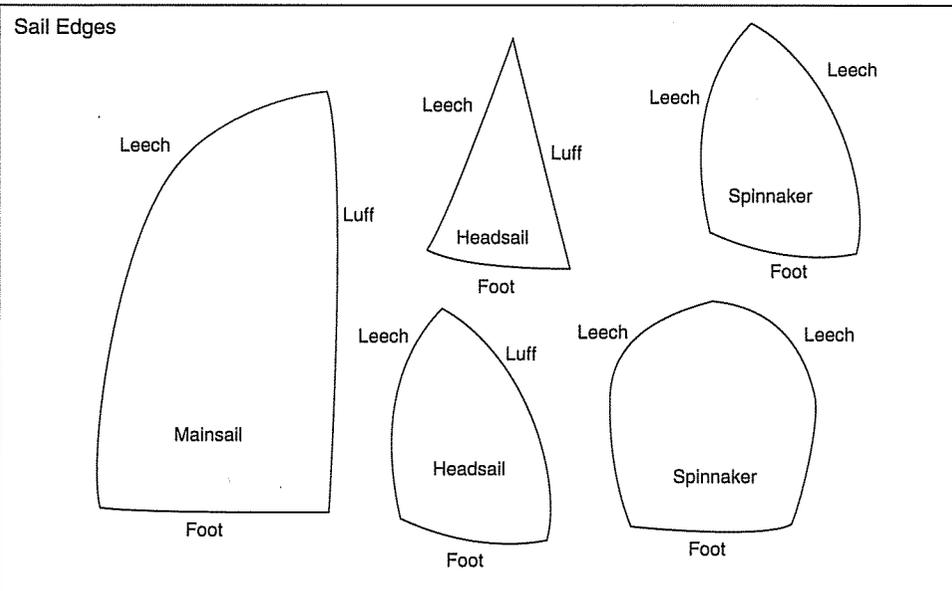
Additional **ply** to form a pocket for a **batten**.

G.1.12 Sail opening:

Any opening other than openings created by normal eyes, cringles, Cunningham holes or reefing eyes.

G.1.13 Window:

A **sail opening** covered by a transparent **ply**.



G.2 SAIL EDGES

G.2.1 Foot:

The bottom edge.

G.2.2 Leech:

(a) Mainsail and headsail: The aft edge.
(b) Spinnaker: The edges other than the **foot**.

G.2.3 Luff:

Mainsail and headsail: The fore edge(s).

G.3 SAIL CORNERS

G.3.1 Clew:

The area where the **foot** and the **leech** meet.

G.3.2 Head:

The area at the top.

G.3.3 Tack:

The area where the **luff** and the **foot** meet.

G.4 SAIL CORNER MEASUREMENT POINTS

G.4.1 Clew point:

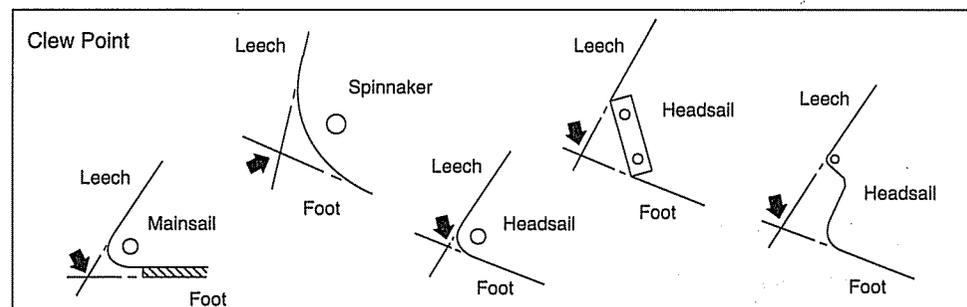
The intersection of the **foot** and the **leech**, each extended as necessary.

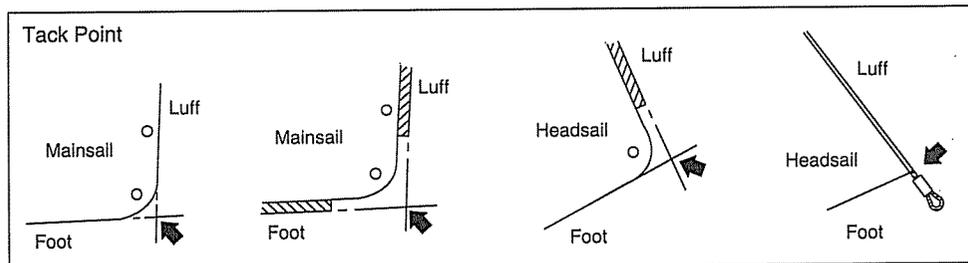
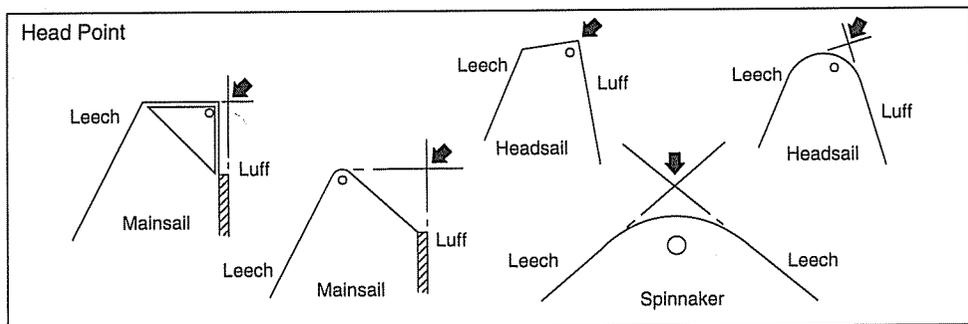
G.4.2 Head point:

(a) Mainsail and headsail: The intersection of the **luff**, extended as necessary, and the line through the highest point of the **sail** at 90° to the **luff**.
(b) Spinnaker: The intersection of the **leeches**, extended as necessary.

G.4.3 Tack point:

The intersection of the **foot** and the **luff**, each extended as necessary.





G.5 OTHER SAIL MEASUREMENT POINTS

G.5.1 Quarter leech point:

The point on the leech equidistant from the half leech point and the clew point.

G.5.2 Half leech point:

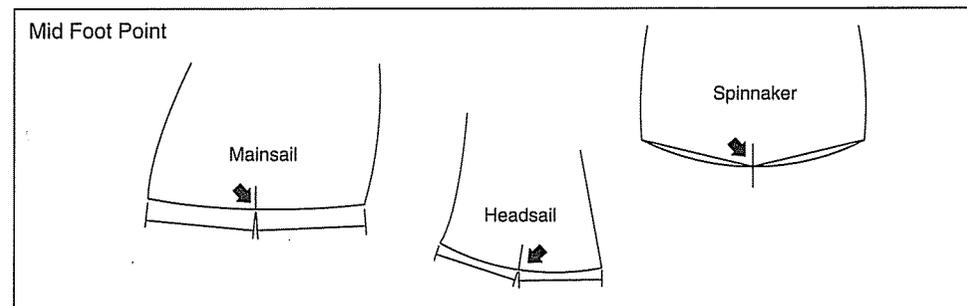
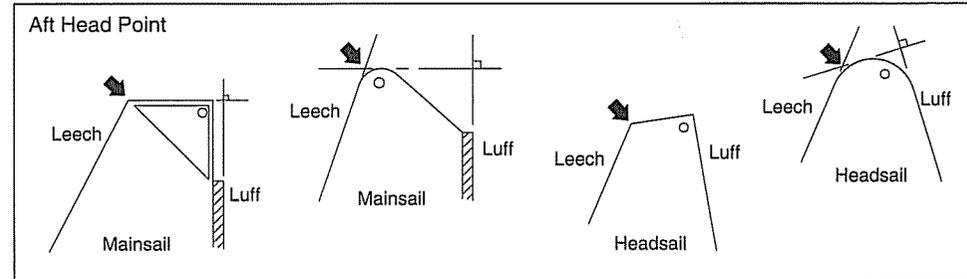
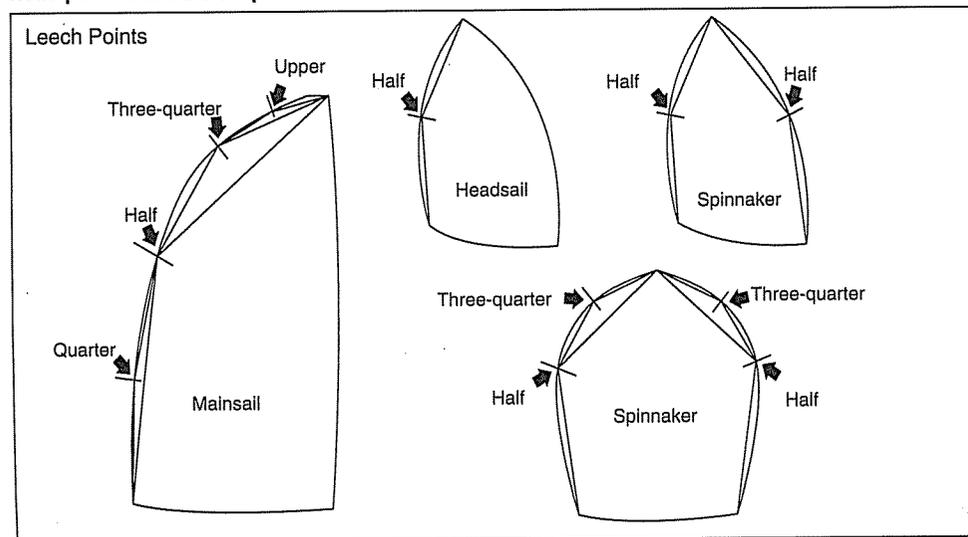
The point on the leech equidistant from the head point and the clew point.

G.5.3 Three-quarter leech point:

The point on the leech equidistant from the head point and the half leech point.

G.5.4 Upper leech point:

The point on the leech a specified distance from the head point.



G.5.5 Aft head point:

The intersection of the leech extended as necessary and the line through the head point at 90° to the luff.

G.5.6 MID FOOT POINT:

- (a) Mainsail and headsail: The point on the foot equidistant from the tack point and the clew point.
- (b) Spinnaker: The point on the foot equidistant from the clew points.

G.6 SAIL REINFORCEMENT

G.6.1 Primary reinforcement:

An unrestricted number of additional ply of permitted material:
 at a corner
 at a Cunningham hole
 at a reefing point adjacent to the luff
 at a reefing point adjacent to the leech
 at a spinnaker recovery point
 where permitted by class rules

G.6.2 Secondary reinforcement:

Not more than two additional ply of permitted material each not thicker than the maximum thickness of the ply of the body of the sail:
 at a corner
 at a Cunningham hole

- at a reefing point adjacent to the luff
 - at a reefing point adjacent to the leech
 - at a spinnaker recovery point
 - at a flutter patch
 - at a chafing patch
 - at a batten pocket patch
- where permitted by class rules

G.6.3 Batten pocket patch: Secondary reinforcement at the inner end of a batten pocket.

G.6.4 Chafing patch: Secondary reinforcement where a sail can touch a spreader, stanchion, shroud or spinnaker pole.

G.6.5 Flutter patch: Secondary reinforcement on the leech or the foot at the end of a seam.

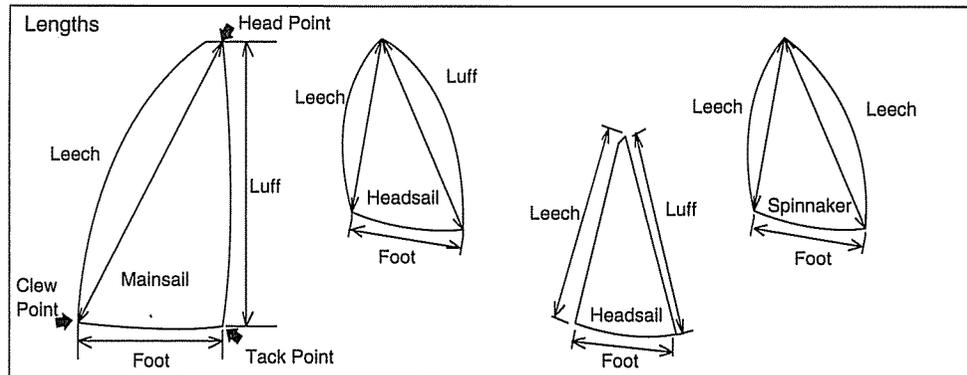
G.7 PRIMARY SAIL DIMENSIONS

G.7.1 Foot length:

- (a) Mainsail and headsail: The distance between the clew point and the tack point.
- (b) Spinnaker: The distance between the clew points.

G.7.2 Leech length:

The distance between the head point and the clew point.



G.7.3 Luff length:

The distance between the **head point** and the **tack point**.

G.7.4 Quarter width:

(a) Mainsail and headsail: The shortest distance between the **quarter leech point** and the **luff**.

(b) Spinnaker: The distance between the **quarter leech points**.

G.7.5 Half width:

(a) Mainsail and headsail: The shortest distance between the **half leech point** and the **luff**.

(b) Spinnaker: The distance between the **half leech points**.

G.7.6 Three-quarter width:

(a) Mainsail and headsail: The shortest distance between the **three-quarter leech point** and the **luff**.

(b) Spinnaker: The distance between the **three-quarter leech points**.

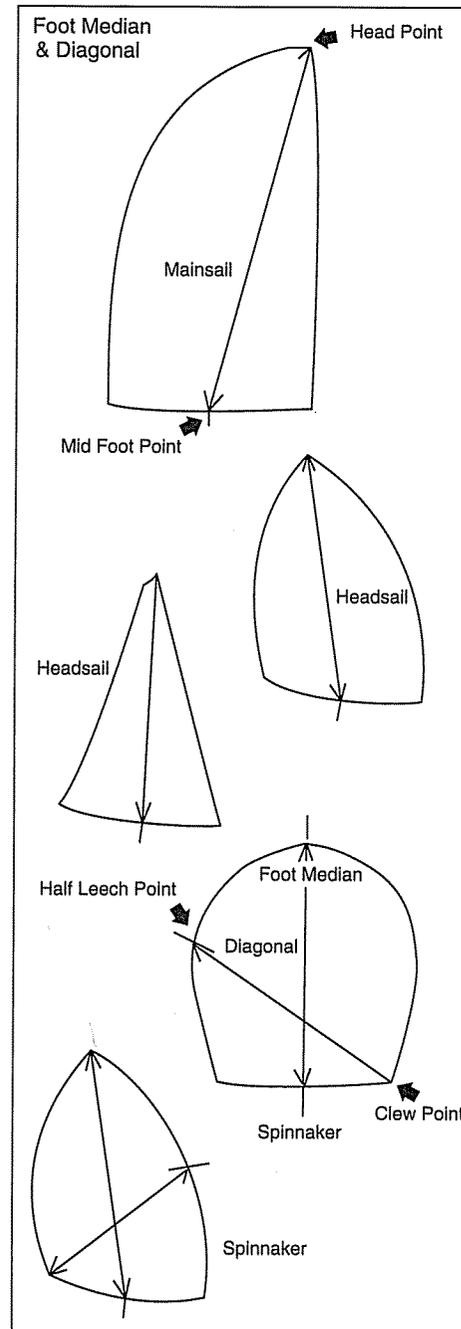
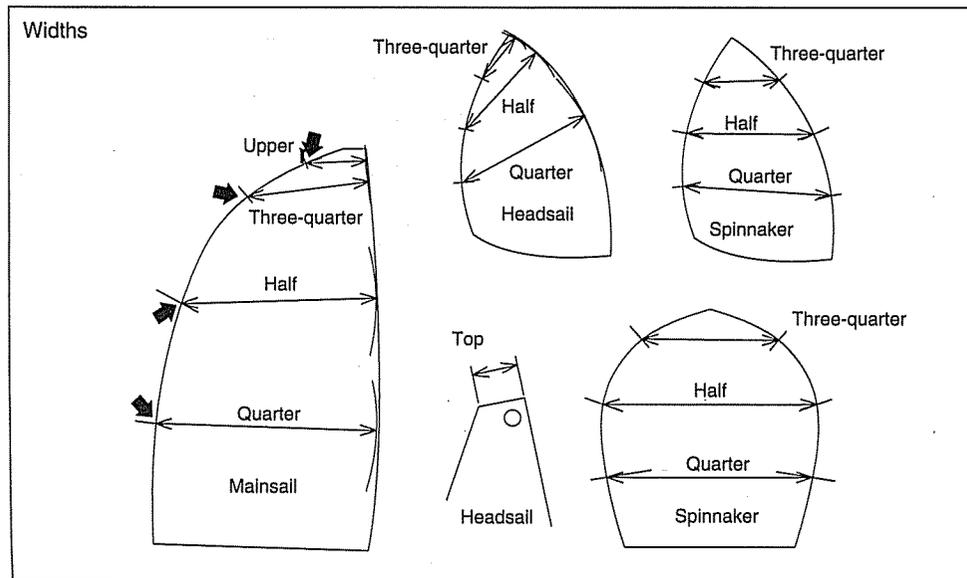
G.7.7 Upper width:

(a) Mainsail and headsail: The shortest distance between the **upper leech point** and the **luff**.

(b) Spinnaker: The distance between the **upper leech points**.

G.7.8 Top width:

The distance between the **head point** and the **aft head point**.



G.7.9 Diagonal:

(a) Spinnaker: The shortest distance between a **clew point** and the opposite **half leech point**.

G.7.10 Foot median:

The distance between the **head point** and the **mid foot point**.

G.7.11 Luff perpendicular:

(a) Mainsail and headsail: The shortest distance between the **clew point** and the **luff**.

G.8 OTHER SAIL DIMENSIONS

G.8.1 Batten pocket length:

(a) **INSIDE:** The distance between the **sail edge** and the internal extreme end of the **batten pocket**, measured parallel to the pocket centreline. The effect of any elastic or other retaining device shall be ignored.

(b) **OUTSIDE:** The distance between the **sail edge** and the external extreme end of the **batten pocket**, measured parallel to the pocket centreline.

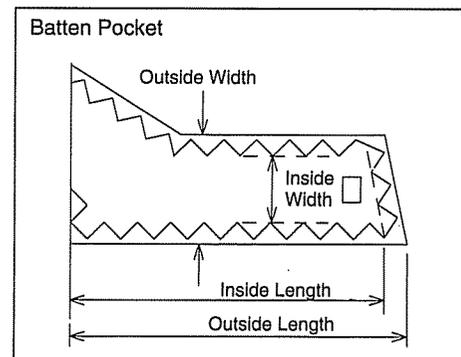
G.8.2 Batten pocket width:

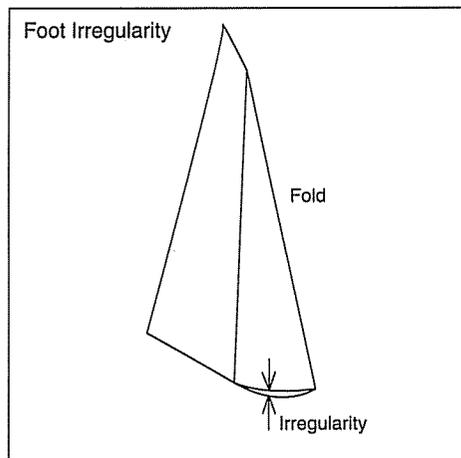
(a) **INSIDE:** The greatest distance between inside edges of the **batten pocket** measured at 90° to pocket centreline. Local widening for batten insertion shall be ignored.

(b) **OUTSIDE:** The greatest distance between the outside edges of the **batten pocket** measured at 90° to the pocket centreline. Local widening for batten insertion shall be ignored.

G.8.3 Foot irregularity:

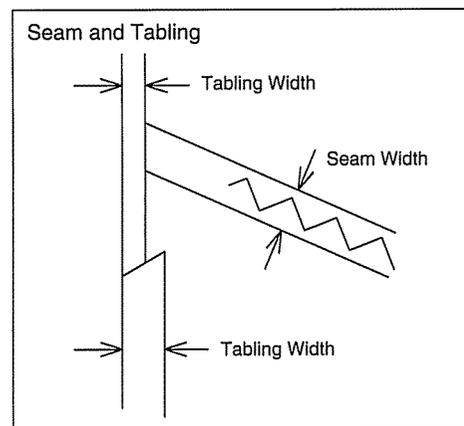
The maximum distance between the edges of the **foot** when first the **tack point** and then the **clew point** are superimposed on any part of the **foot**.



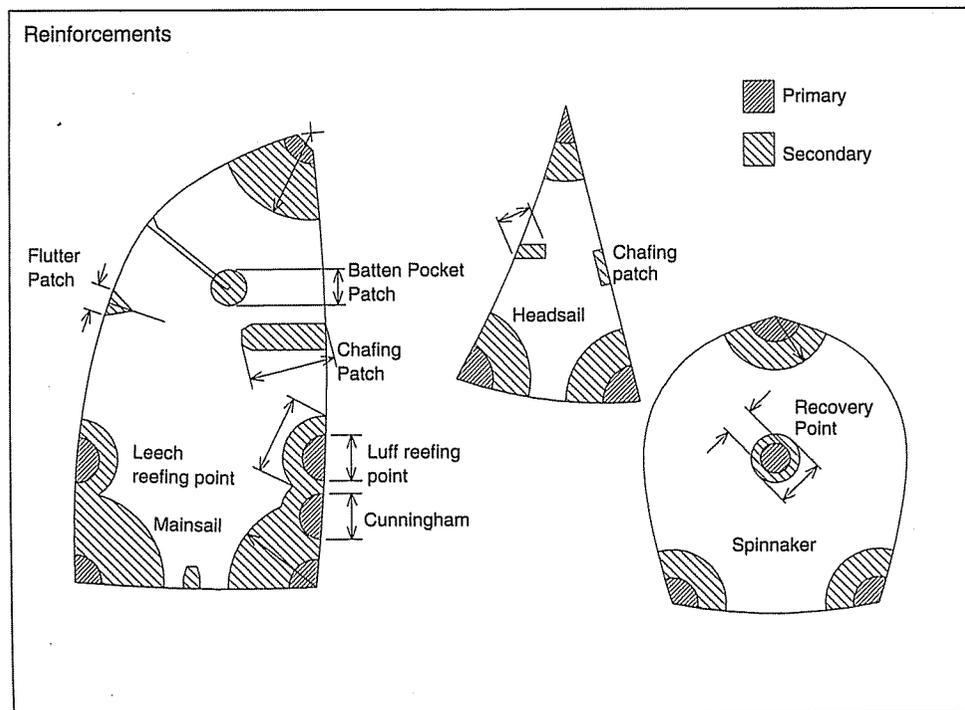


G.8.5 Seam width:
The width of a seam measured at 90° to the seam.

G.8.6 Tabling width:
The width of a tabling measured at 90° to the sail edge.



G.8.4 Sail reinforcement size:
(a) At a corner: The greatest dimension of the sail reinforcement from the sail corner measurement point.
(b) Elsewhere: The greatest dimension of the sail reinforcement.

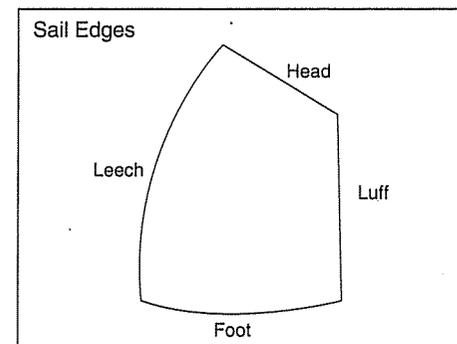


SUBSECTION B – ADDITIONS FOR QUADRILATERAL SAILS

The following definitions for quadrilateral sails, e.g. 'Gaff sails', 'Lugsails' and 'Spritsails', are additional to or vary those given in Subsection A of this Section.

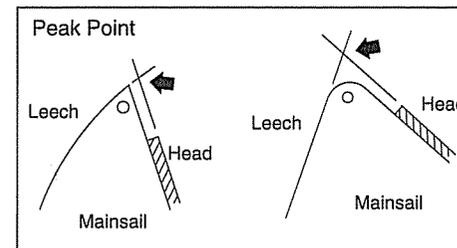
G.2 SAIL EDGES

G.2.4 Head:
The top edge.

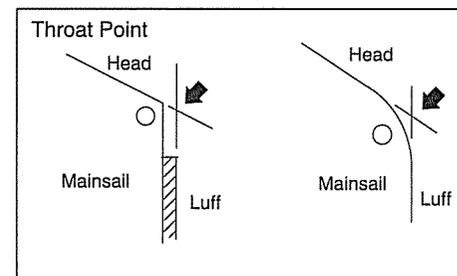


G.3 SAIL CORNERS

G.3.4 Peak:
The area where the head and the leech meet.



G.3.5 Throat:
The area where the head and the luff meet.



G.4 SAIL CORNER MEASUREMENT POINTS

G.4.4 Peak point:
The intersection of the head and leech, each extended as necessary.

G.4.5 Throat point:
The intersection of the head and luff, each extended as necessary.

G.5 OTHER SAIL MEASUREMENT POINTS

G.5.2 Half leech point:
The point on the leech equidistant from the peak point and the clew point.

G.5.3 Three-quarter leech point:
The point on the leech equidistant from the peak point and the half leech point.

G.5.4 Upper leech point:
The point on the leech at a specified distance from the peak point.

G.7 PRIMARY SAIL DIMENSIONS

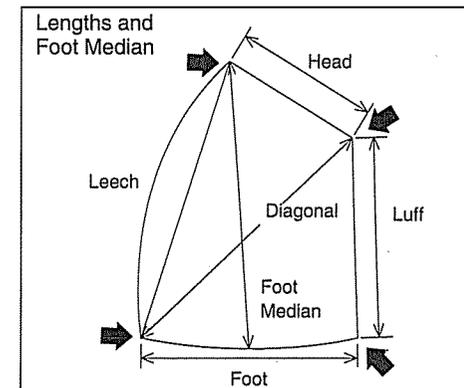
G.7.2 Leech length:
The distance between the peak point and the clew point.

G.7.3 Luff length:
The distance between the throat point and the tack point.

G.7.9 Diagonal:
The distance between the throat point and the clew point.

G.7.10 Foot median:
The distance between the peak point and the mid foot point.

G.7.12 Head length:
The distance between the peak point and the throat point.



PART III – Measurement Rules

SECTION H – MEASUREMENT

H.1 MEASURERS

H.1.1 A measurer shall not measure any part of a **boat** owned, designed or built by himself, or in which he is an interested party, or has a vested interest, except where permitted by the NA.

H.1.2 If an **official measurer** is in any doubt as to the application of, or compliance with, the **class rules** of any part of a **boat** he shall consult the NA before signing a measurement form or attaching a **certificate mark**.

H.1.3 An **official measurer** shall only carry out **fundamental measurement** in another country with the prior agreement of the NA in the country where the measurement shall take place.

H.1.4 If an **event measurer** is in any doubt as to the application of, or compliance with, the **class rules**, the question should be referred to the NA, or its delegate authority for the class, in the country where the event takes place.

H.2 AXES OF MEASUREMENT

H.2.1 Words such as 'fore', 'aft', 'above', 'below', 'height', 'depth', 'length', 'beam' and 'freeboard' acquire a precise meaning in measurement as they are all taken to refer to a **boat** in measurement trim. All measurement denoted by these, or similar words, shall be taken parallel to one of the three major axes of the **hull** – vertical, longitudinal or transverse – related to the waterline and the centreplane of the **hull**.

H.2.2 Width, thickness, length etc. of a component shall be measured as appropriate for that component, without reference to the **hull** axes.

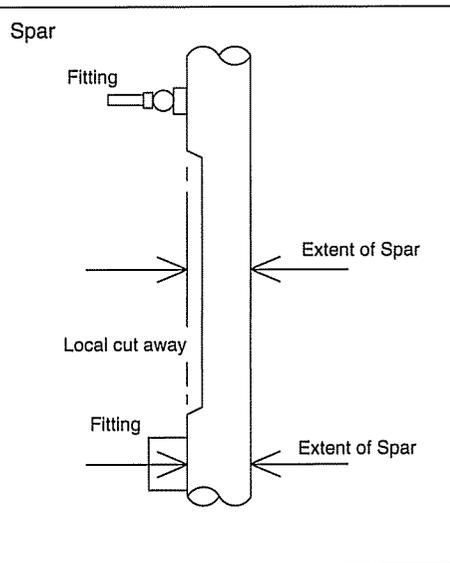
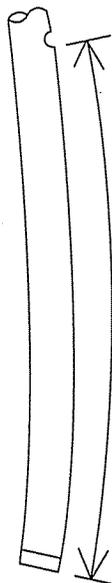
H.3 RIG MEASUREMENT

H.3.1 Measurements in the length direction shall be taken along the **spar** at the side relevant for the measurement and between planes through the measurement points at 90° to the **spar**.

H.3.2 Fittings, local curvature and local cut away, shall be ignored when measuring a **spar**.

H.3.3 No external pressure shall be applied to a **spar** when measuring unless specifically prescribed.

Spar Length Measurements



H.3.4 Adjustable fittings shall be set in the position that gives the greatest value when the measurement is taken.

H.3.5 When **mast spar** deflection or **boom spar** deflection is checked, free ends of **rigging** shall not be supported by the **spar**.

H.3.6 When **mast tip weight** is checked, halyards shall be fully hoisted and **rigging** shall be tied to the **spar** at the **lower band** with lower ends hanging free or resting on the ground

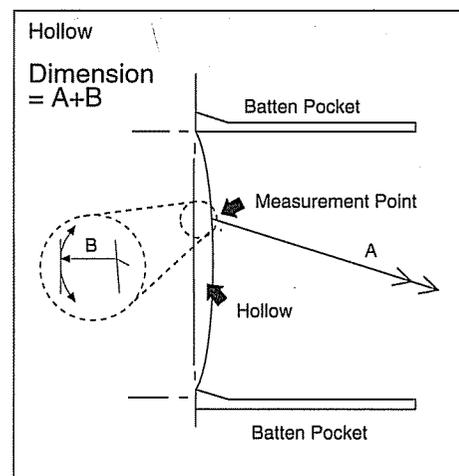
H.4 SAIL MEASUREMENT

H.4.1 Conditions of a sail

The **sail** shall:
 be dry
 not be attached to **spars** or **rigging**
 have all battens removed
 have pockets of any type flattened out
 have just sufficient tension applied to remove wrinkles across the line of the measurement being taken
 have only one measurement taken at a time.

H.4.2 Hollows and attachments

- (a) Where the **sail edge** is hollow;
 - between adjacent **batten pockets**;
 - between the **aft head point** and adjacent **batten pocket**;
 - between the **clew point** and adjacent **batten pocket**;
 - between the **tack point** and adjacent **batten pocket**;
- and a **measurement point** falls in the hollow, the sail shall be flattened out in the



area of the **sail edge**, the hollow shall be bridged by a straight line and the shortest distance from the **measurement point** to the straight line shall be measured. This distance shall be added to the measurement being taken.

- (b) An attachment outside a **sail edge** at a **measurement point** shall be bridged by a straight line and the measurement taken to the bridging line. Bolt ropes are not attachments.

H.5 CHECKING MATERIALS

A measurer is not required to check materials unless the **class rules** specifically prescribe this.

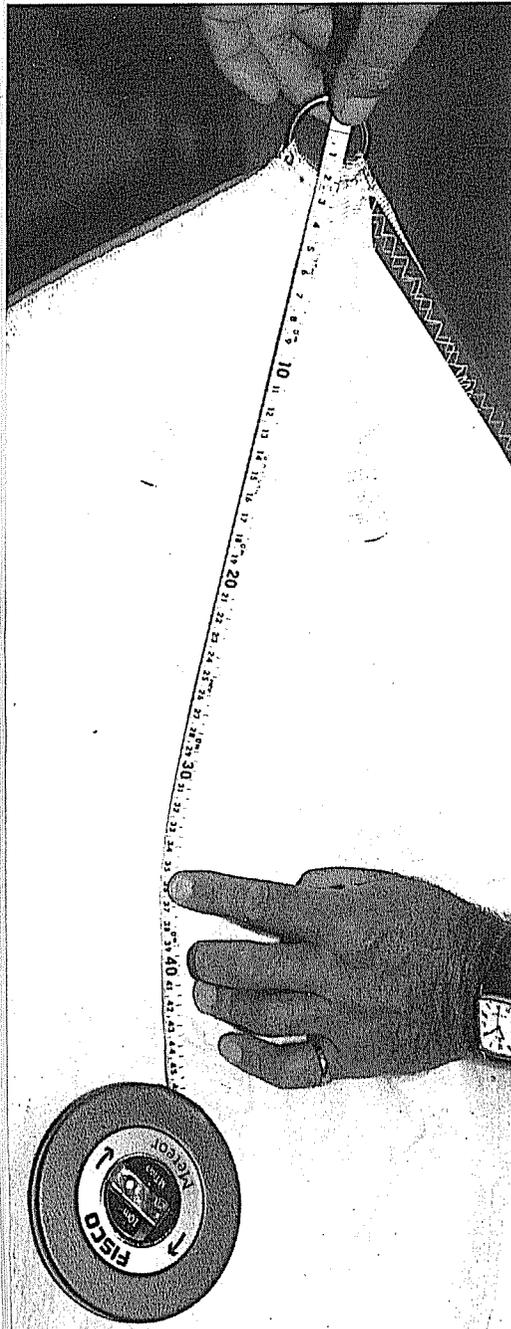
ISAF Guide to Sail Measurement 1997- 2000

INTRODUCTION

Where a term defined in the Equipment Rules of Sailing is used in this guide in its defined sense it is printed in **bold type**

Abbreviations

ISAF	International Sailing Federation
NA	ISAF National Authority
CA	Class Association
RRS	The Racing Rules of Sailing
ERS	The Equipment Rules of Sailing



PART A - General

A.1 About this Guide

This guide is intended to help measurers understand the ISAF Equipment Rules of Sailing for sail measurement and associated racing rules and to assist in achieving correct, accurate and consistent measuring of sails. It is not part of any rules.

A.2 Responsibilities and Authorities

Should a measurer be in any doubt as to the application of a rule or measurement instruction, the question should be referred to the measurer's NA or its delegate (ERS H.1.2).

It is not a measurer's job to make rule interpretations.

Measurers are responsible for:

- a) Providing the measuring equipment and possessing complete and up to date copies of **class rules** and interpretations, racing rules, and any other relevant documents.
- b) Carrying out measurement so that the dimensions are taken accurately.
- c) Measuring as required by **class rules** and the relevant racing rules, and recording their findings, either on the class measurement form, if measuring at the request of the owner, or in a report to the appropriate race committee.
- d) Keeping a record of each completed measurement form or measurement report, giving the date of measurement, the effective date of the **class rules** used, the class of boat, sail and plaque number, actual measurements taken, and any relevant comments.
- e) Ensuring that they have the necessary authority to undertake the measurement.

The authority afforded to a measurer falls into three distinct categories (ERS C.5)

- f) **Official Measurers**
Official measurers have the authority to measure new or replacement items, and to carry out **fundamental measurement**. This type of measurement is not normally undertaken at events. When acting in this capacity, the measurer is responsible to the owner and NA/CA, to which the measurer should make all formal reports.
- g) **Event Measurers**
Event measurers are afforded authority to measure at a specific event by the race committee. When acting in this capacity, the measurer is under the sole jurisdiction of the race committee, to which all formal reports should be made (RRS 78.3).
- h) **International Measurers**
These measurers are appointed by the ISAF to act at international events. Their authority is the same as those of **event measurers**.

With the exception of adding sail or buoyancy endorsements as permitted by some **class rules**, a measurer has no authority to add or alter any of the details of a **certificate**. If it is brought to the attention of a measurer that the details of a **certificate** are in some way incorrect, then the measurer should advise the owner and the **certification authority**.

A.3 Fees

Measurers are recommended and encouraged to charge for their service. This is important as, unlike a Juror, the actions of a measurer might have long term ramifications for a class. A measurer is also responsible for providing and ensuring the accuracy of measurement tools and equipment as well as being professionally liable for the service they provide.

A.4 Fundamental Measurement

This type of measurement is used when undertaking the initial measurement of new (or replacement) sails prior to their being certification marked by a measurer. In each case, all the dimensions required to be taken by **class rules** should be checked, and a record kept of the measurements found. Where required by **class rules** or an NA, the sail should also be inspected for compliance with other **class rules** and with RRS 77 & RRS Appendix H, Sail Numbers and RRS 79 & RRS Appendix G, Advertising.

When measuring a new sail, the measurer is acting on behalf of the owner and the NA/CA and should, within the limits of the rules, endeavour to safeguard the interests of that owner and NA/CA.

No sail should be certification marked until its full and complete compliance with the rules has been established.

A.5 Event Measurement Checks

These are normally undertaken at an event prior to the first race, when the time available is usually at a premium. For this reason it is common for only partial measurement of all, or just some, sails to be undertaken. In addition, in an endeavour to speed up procedures, changes are often made to the way in which measurement is carried out. Sometimes this is merely visual inspection, verification of initial measurement and **certification marks** or just limitation stamping.

If, during **event measurement**, there is doubt as to the compliance of a sail, the measurer should use the fundamental procedures.

When event measuring, a measurer is acting on behalf of or as part of the race committee and, as such, is bound by the Notice of Race, Sailing Instructions and RRS 78.3. Although there is good sense in a race committee appointing an **official measurer** to act at an event, this is not mandatory. Similarly, an NA or CA should beware of usurping a race committee's authority during **event measurement**.

A.6 Class Rules

Where a particular **class rule** and the ERS are in conflict, the **class rule** shall prevail. Where no limits for a particular dimension are given in **class rules** nor in the RRS, the item need not be measured.

A.7 Headsail or Spinnaker?

Neither the ERS nor this guide attempt to make a distinction as to whether a particular sail is a headsail or a spinnaker. The difference should normally be specified in **class rules** as, due to the close similarity in shape of some of these sails, the difference between the two types is purely a matter of usage rather than measurement. Regardless of the shape of a sail, if **class rules** call it a headsail, or where **class rules** require it to be measured as a headsail, the sail should be measured as a headsail. Similarly, if **class rules** call a sail a spinnaker, or require the sail to be measured as a spinnaker, it should be measured as a spinnaker.

PART B - Fundamental Measurement**B.1 Tools and Equipment**

In the majority of cases, the accurate measurement of a **sail** may be undertaken using the following tools and equipment:-
steel tapes of good quality
micrometer (see Appendix I)
feeler gauge
batten of uniform flexibility
pencil
permanent marker pen
stamp and ink pad
(Additional equipment will be required to determine the **ply** weight. See Appendix I)

A measurer may supplement this list with other tools or equipment that either improve the accuracy of, or the time taken on, measurement. For pre-event check measurement this is encouraged as detailed in Part C of this guide.

B.2 Sail Construction (ERS G.1)**B.2.1 WHAT IS MEANT BY THE WORD PLY?**

A **ply** is a sheet of **sail** material made up of one or more lamina. For example a layer of film bonded to a woven fabric is a **ply**; in fact a **laminated ply**. A **sail** with its body made from one sheet of this **ply** would be a **single-ply sail**. If two sheets of the material were used next to each other this would be a **two-ply sail**. The word **ply** is both singular and plural.

If **class rules** give no restriction as to the number of **ply** that may be used it can be assumed that the number is optional.

B.2.2 WHAT IS WOVEN PLY?

When a **woven ply** is torn it will be possible to separate the fibres without leaving evidence of a film. Thus **ply**, (often referred to as 'Mylar' a trade name for one particular polyester film), which comprises a woven base on which a plastic film has been bonded is considered to be non-woven.

B.2.3 SOFT SAIL

It is normally quite easy to establish if a **sail** is soft without having to fold it and risk 'damaging the **ply**'. However, in cases of doubt, if it is claimed that the **sail** is soft, a measurer should fold the **ply**, usually in an area of **secondary**

reinforcement. If the measurer is unable to flatten the **ply** when applying pressure between forefinger and thumb or the **sail** suffers damage more than a crease line, then the **sail** is not soft.

B.2.4 PLY WEIGHT

There are a number of classes which specify minimum **ply** weights. Before discussing the problems associated with such rules, it is necessary to be aware of the different units used to describe **ply** weight.

These are:
ounces (oz)
ounces per square yard (oz/sq yd)
grammes per square metre (g/m²)

When the weight is given as x ounces, this refers to the weight of one yard run of cloth 28.5 inches wide - this being the standard width in which the **ply** used to be woven. It is the way in which most US **ply** are described.

Figure 1a shows the comparison between the three units, and enables conversion to be made from one system to another.

A manufacturer's quoted **ply** weight may be for the material before the addition of finishes. This will not be the same as the weight of the material used in the construction of **sails**, so care should be taken to avoid confusion.

It is difficult to determine whether or not a **ply** is in accordance with the weight rule. There are two ways of undertaking this:

- determining the weight of the **ply**
- measuring the thickness of the **ply**

B.2.4.1 PROCEDURE FOR DETERMINING THE WEIGHT OF PLY

Equipment:
Sample cutter and scales
Details of approved equipment are given in Appendix I.

Method

Five samples of **ply** should be accurately 'die-cut' from different places in the **sail**, not less than 25% of the **foot length** apart. All five samples must be carefully placed in the draught-free compartment of a levelled laboratory scale, the scale carefully balanced, and the combined

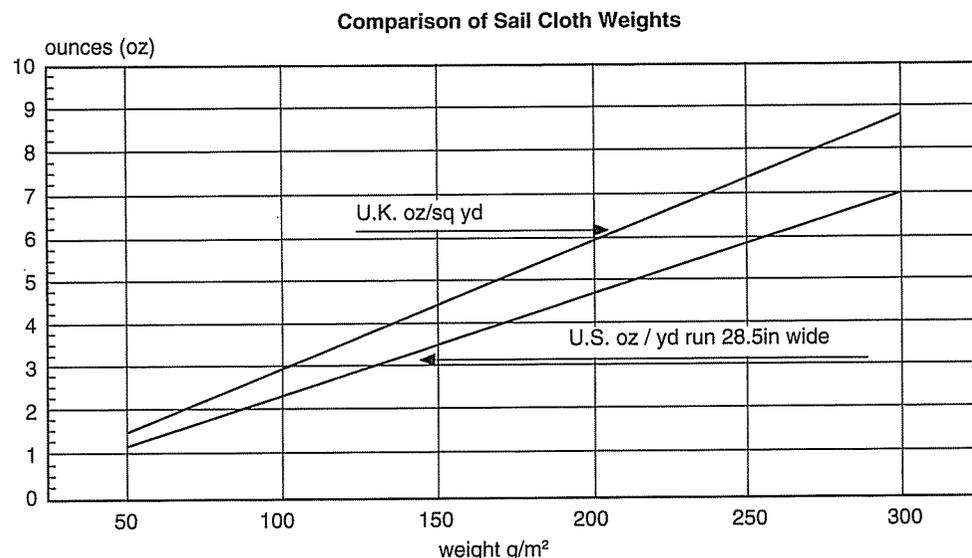


Figure 1a

Relationship between Folded Thickness and Weight

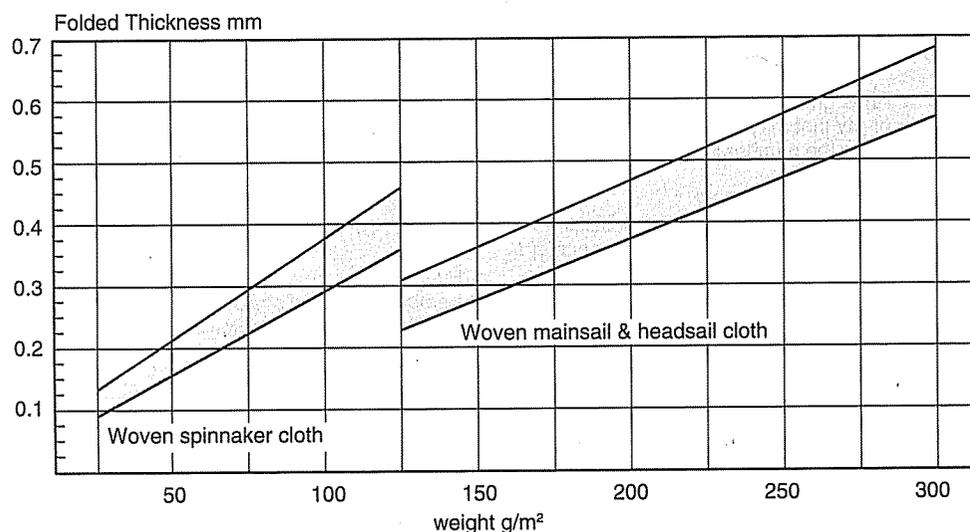


Figure 1b

weight of the five samples read off. This weight, divided by five and corrected to the units specified in the **class rules**, shall be taken as the weight of the **ply**. Great care should be taken during the scale zeroing operation.

2.5 PLY THICKNESS

There is a relationship between the thickness of **woven ply** and its weight, and some classes use this to permit weight to be determined by thickness measurement. There are, however, a number of factors, including closeness of the weave and the types of finish applied, which make this relationship less than precise. This is shown by Figure 1b which compares the **woven ply** weight with the folded thickness.

Measurers should also be aware that **sail** material from a single roll may vary in thickness by anything up to $\pm 10\%$.

B.2.5.1 MEASURING THE THICKNESS OF PLY

Where **class rules** control **ply** thickness, this is usually the minimum thickness. It is thus important that measurement is taken at the thinnest area, particular if the **sail** is lofted from a laminated **ply** with open weave scrim. If the micrometer measuring surfaces permit, thickness measurements should be taken between the scrim. The measurer should take as many thickness measurements as necessary

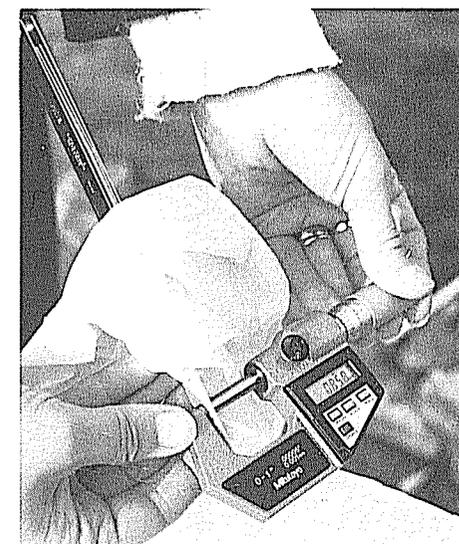


Figure 2. Measuring the thickness of Ply

to be satisfied that a **sail** is in compliance with **class rules**. The dimensions recorded shall be absolute and not averaged.

A micrometer and feeler gauge will be needed (see Appendix I).

Before taking any measurements, carefully clean the micrometer measuring surfaces and zero or calibrate using the feeler gauge.

Always bring the measuring surfaces together slowly and uniformly when checking zero and when taking measurements.

Do not scrape the sail cloth with the micrometer while positioning for a measurement or during removal, as this may result in a resin build up on the measuring surfaces which can cause erroneous readings.

When taking double thickness measurements, which will be necessary to measure in the **body of the sail**:

- fold but do not crease the sail.
- open the micrometer wide enough to enable the jaws to pass over doubled roll without scraping.
- place the feeler gauge between the two **ply** layers. This prevents the surface of one layer meshing with the other. Subtract the feeler gauge thickness from the micrometer reading.

Stiff cloth may require two or more padded clamps carefully placed near the point of measurement to hold the two layers together.

Re-check for clean measuring surfaces and zero or re-calibrate frequently, especially before re-checking measurements close to or outside specified class limits.

B.2.6 REINFORCEMENT

Check **class rules** for the permitted material of **primary** and **secondary reinforcement**.

**B.3 Measurement Points
(ERS G.4, G.5 & H.4.2)**

B.3.1 CORNER MEASUREMENT POINTS AND AFT HEAD POINT (ERS G.4 & G.5.5)

To find a **corner measurement point** or the **aft head point** may require the extension of the line of the **edges of the sail** adjacent to the **point**.

Where the line of the extension of the edge is obvious this should be used. Placing a batten along the edge can often help to give a true extension line continuing any curve. See Figure 3.

Where the line of the extension of the edge is uncertain and not repeatable leading to inconsistent **measurement points**, the measurement of the **sail** should be refused.

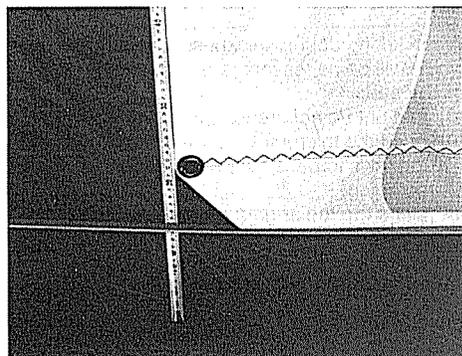


Figure 3. Headsail Clew Point

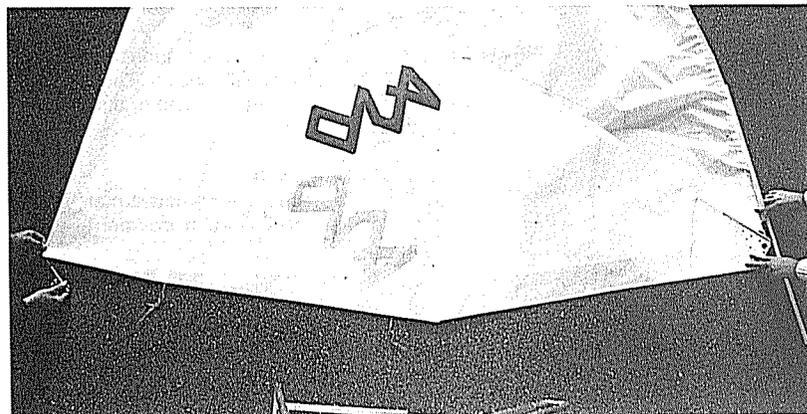


Figure 4. Finding a Mainsail Half Leech Point

B.3.2 LEECH POINTS (ERS G.5.1 TO G.5.4)

Note: The position of **leech points** may be affected by hollows. See B.3.4

The **half leech point** is found by folding the **head point** to the **clew point** and equally tensioning the two halves of the **leech** so formed. The **half leech point** is the intersection of the fold and the **leech**. See Figures 4 and 5.

The **quarter** and **three-quarter points** are found similarly by folding the **clew point** and the **head point** respectively to the **half leech point**. The **points** are the respective intersection of the folds and the **leech**. See Figures 6, 7, 8 and 9.

The set distance of the **upper leech point** from the **head point**, when specified in **class rules**, is measured in a straight line across the **sail** as defined.

B.3.3 MID FOOT POINT (ERS G.5.6)

The **mid foot point** is found by folding the **tack point** to the **clew point** or, with a spinnaker, one **clew point** to the other **clew point**, and equally tensioning the two halves of the **foot** so formed. The **mid foot point** is the intersection of the fold and the **foot**.



Figure 5. Finding a Spinnaker Half Leech Point

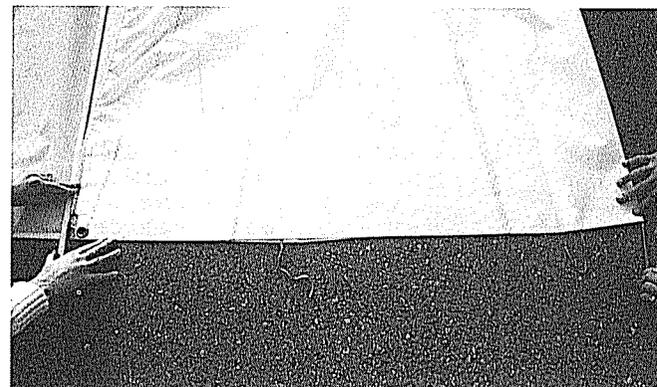


Figure 6. Finding a Mainsail Quarter Leech Point

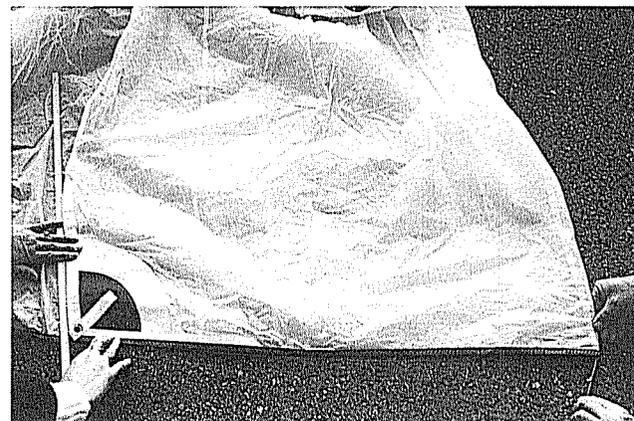


Figure 7. Finding a Spinnaker Quarter Leech Point

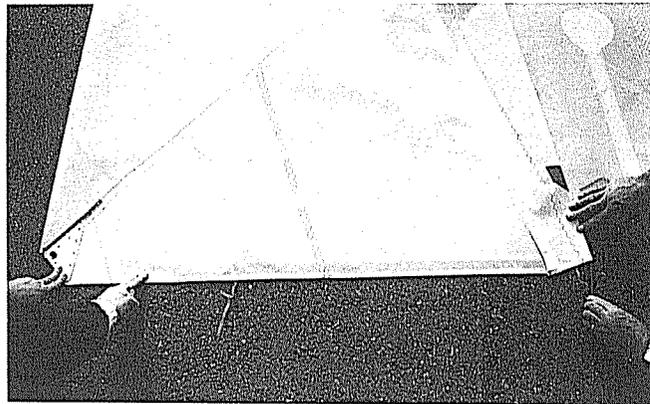


Figure 8. Finding a Mainsail Three-quarter Leech Point

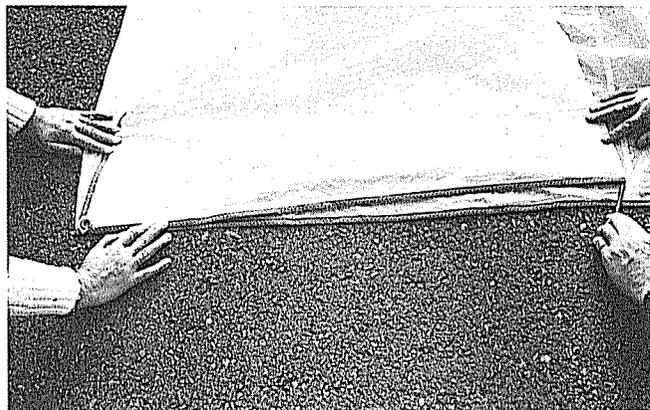


Figure 9. Finding a Spinnaker Three-quarter Leech Point

B.3.4 HOLLOW (ERS H.4.2)

The presence of a hollow shall be determined with the **sail flat** in the area between the items referred to in ERS H.4.2.

Where a hollow exists in the vicinity of a **measurement point**, e.g. on the **edge of a sail** at the end of the **half leech point**, the **sail** shall be flattened out in the area of the hollow, the hollow bridged by a straight line, and the shortest distance from the **measurement point** to the bridge line shall be added to the measurement being taken.

B.4 Condition of Sail During Measurement (ERS H.4.1)

B.4.1 GENERAL

The **sail** shall be as required by ERS H.4.1 and be at ambient humidity and temperature.

B.4.2 SHAPE OF THE SAIL EDGE (ERS H.4.1)

To check the shape of the **sail edge** the **sail** shall be flat in the area being checked. This is achieved as follows:-

- a) lay the **sail** out on a flat surface. Figure 10.
- b) fold or flake the **sail** as shown in Figure 11.
- c) work any wrinkles near the edge into the fold.
- d) take the **sail edge** to be checked a short distance from the corner and pull the **sail edge** with the same tension as required for measurement.



Figure 10. Sail before flaking

The shape of the edge, which should now be flat, can be gauged against a straight line produced by a string, or the edge of a measuring tape, stretched along the edge of the **sail**.



Figure 11. Sail after flaking

spinnaker may necessitate the taking of two part measurements to an intermediate point, with the sum of these giving the dimension of the defined measurement. See Figures 12 and 13.

B.5 Lengths (ERS G.7)

B.5.1 FOOT, LEECH & LUFF LENGTHS, DIAGONAL AND FOOT MEDIAN (ERS G.7.1, G.7.2, G.7.3, G.7.9, G.7.10)

All lengths shall be measured as the straight line distance as defined. Lengths shall be measured with the **sail** laid out with the tension applied as required by ERS H.4.1. **Corner reinforcements** which cannot be 'straightened' at the head of the

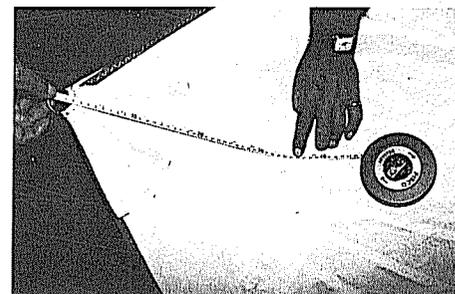


Figure 12. Measurement of head part of Foot Median

B.5.2 LUFF PERPENDICULAR (ERS G.7.11)

The **luff perpendicular** shall be measured as the shortest straight line distance swung across

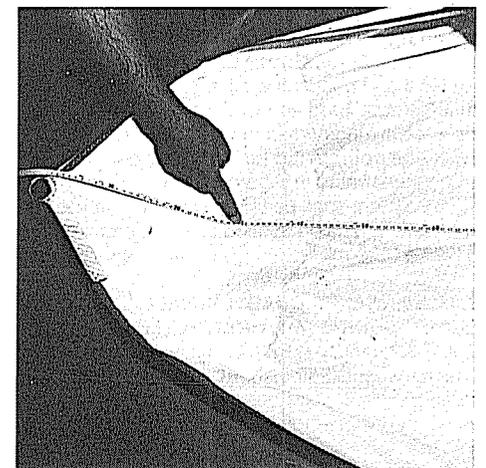


Figure 13. Measurement of remainder of Foot Median

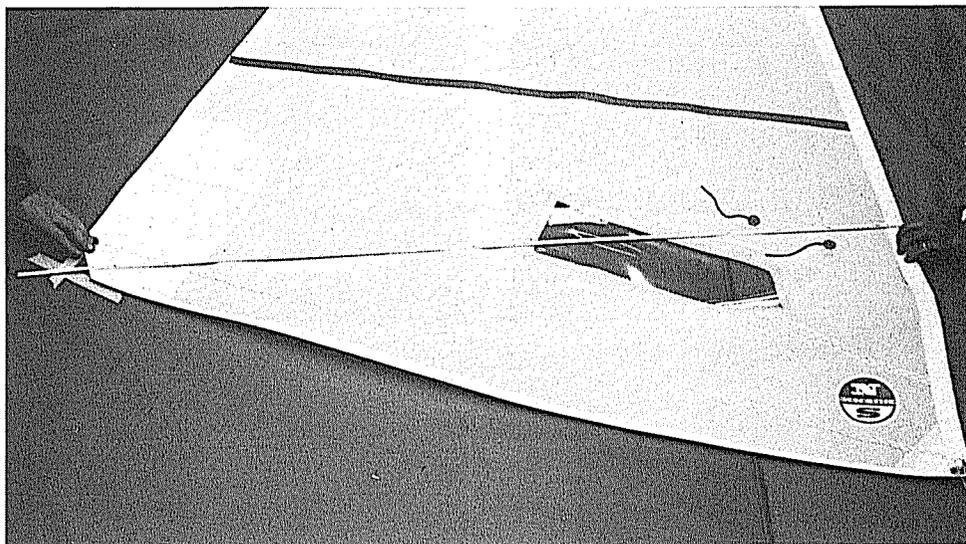


Figure 14. Headsail Luff Perpendicular

the sail by a tape from the clew point to the luff as appropriate, including bolt rope if any, as illustrated in Figure 14. The measurement shall be taken with the sail laid out with the tension applied as required by ERS H.4.1.

B.6 Widths (ERS G.7)

B.6.1 MAINSAIL AND HEADSAIL QUARTER, HALF, THREE-QUARTER AND UPPER WIDTHS (ERS G.7.4, G.7.5, G.7.6, G.7.7)

Mainsail and headsail widths, except top width, shall be measured as the shortest straight line distance swung across the sail by a tape from the leech point to the luff including bolt rope if any, as illustrated in Figure 15. The measurement shall be taken with the sail laid out with the tension applied as required by ERS H.4.1.



Figure 15. Mainsail Half Width

B.6.2 SPINNAKER QUARTER, HALF, THREE-QUARTER AND UPPER WIDTHS (ERS G.7.4, G.7.5, G.7.6, G.7.7)

The spinnaker widths shall be measured as the straight line distance between the leech points as defined. The measurements shall be taken with the sail laid out with the tension applied as required by H.4.1. See Figure 16.



Figure 16. Spinnaker Half Width

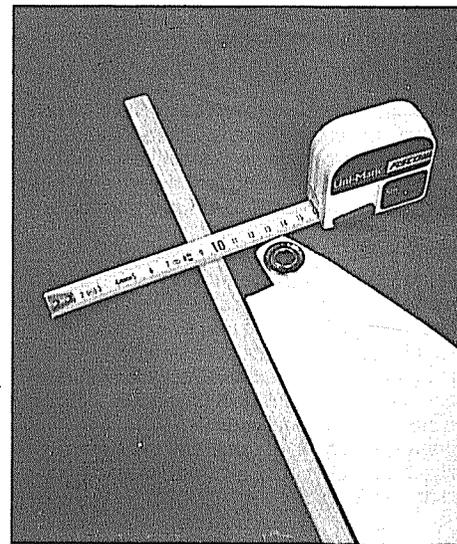


Figure 17. Headsail Top Width

B.6.3 TOP WIDTH (ERS G.7.8)

Top width shall be measured as the straight line distance as defined. It shall be taken with the sail laid out with the tension applied as required by H.4.1. See Figure 17.

B.7 Other Measurements (ERS G.8)

7.1 REINFORCEMENT SIZE (ERS G.8.4)

Corner reinforcement size, whether primary or secondary, is measured from the corner measurement point, which may be outside the sail. The measurement is the greatest dimension from the corner measurement point, and should be found by swinging an arc with the tape as illustrated in Figure 18. Permitted tabling is not included in the measurement of reinforcement.

The measurement of any reinforcement, other than at one of the corners of the sail shall be taken to be the greatest dimension between any two points of the same reinforcement. This may not necessarily be continuous across the reinforcement.

B.7.2 BATTEN POCKET LENGTH (ERS G.8.1)

The inside and outside lengths of a batten pocket are measured ignoring the effect of any elastic or other batten retaining device.

The inside length is the dimension measured parallel to the centreline of the pocket from the sail edge to the inside of the stitching, fold or similar at the inside end of the pocket.

The outside length is measured parallel to the centreline of the pocket, from the sail edge to the extreme end of the pocket.

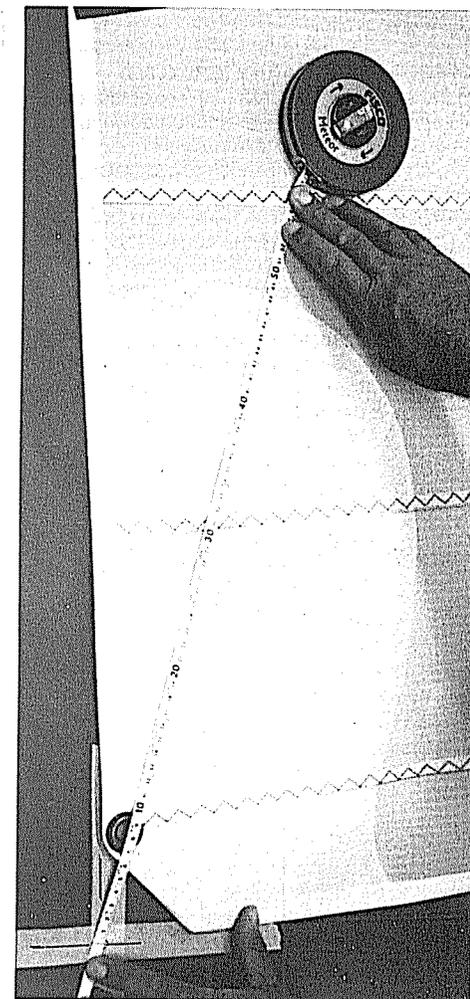


Figure 18. Clew Reinforcement

B.7.3 BATTEN POCKET WIDTH (ERS G.8.2)

Local widening for batten insertion is not included in the measurement of either inside or outside **batten pocket width**.

The inside width is measured at 90° to the centreline of the pocket, between the inside of the stitching or similar on each side of the pocket.

The outside width is measured at 90° to the centreline of the pocket, between the outside edges of the pocket.

B.7.4 FOOT IRREGULARITY (ERS G.8.3)

With the **sail flat** in the area of the **foot**, the **tack point** should be folded over and run down the edge of the **foot**, and its extensions if necessary, until it reaches the **clew point**. During this procedure, the greatest dimensional difference between the two parts of the **sail edge**, measured at 90° to the edges, should be noted. The same procedure should be undertaken, folding over and running the **clew point** down the edge of the **foot** until it reaches the **tack point**. Again, the greatest dimensional difference between the **sail edges** should be noted. The **foot irregularity** is the greater of the two noted dimensions.

**B.8 Sail Numbers
(RRS 77 & RRS Appendix H)**

Measurement requirements for the size, shape and position etc. of class insignia, national letters and sail numbers are laid down in RRS 77 & RRS Appendix H, and in most individual **class rules**. These shall be checked where required to be so by **class rules** or an NA. Where there are differences between the RRS and **class rules**, the **class rules** shall prevail. Where **class rules** invoke the RRS then, except when altered by **class rules**, the RRS shall be applied.

RRS Appendix H - 1.2(a) requires, amongst other things, the national letters and sail numbers to be 'clearly legible'. Determination of this requirement will be relative and is not strictly a matter of measurement.

Several classes specify the colour of insignia, letters and numbers. Where this is not the case, the RRS Appendix H - 1.2(a) rule should be

applied. This requires the national letters and sail numbers (but not the insignia) to be of the same colour.

RRS Appendix H - 1.2(b) gives the boat's overall length as the criteria for character size and the space between adjoining characters. Overall length shall be the longitudinal distance between the extremes of the hull or its fixed structures.

RRS Appendix H - 1.3(a) requires the class insignia, national letters and sail numbers on the starboard side of mainsails and headsails to be higher than those on the port side. For clarity, each of these items should be treated separately, i.e. the starboard insignia should be higher than the port insignia (subject to 1.3(b)), the starboard national letters shall be higher than the port national letters and the starboard sail numbers should be totally above the port sail numbers.

RRS Appendix H - 1.3(c) requires that, on sails measured after 31 March 1997, where national letters are displayed, these are placed above the sail numbers.

Sails measured after 1 April 1993 that need to display national letters should use the three letter country codes, whereas sails measured prior to 1 April 1993 may display the old code.

**B.9 Advertising
(RRS 79 & RRS Appendix G)**

The size and position of permitted advertising on **sails** is governed by RRS 79 & RRS Appendix G. This may not be modified or changed by **class rules**.

For unsponsored Category A events (the default category), the only advertising permitted on a **sail** (in addition to the class insignia) is one sailmaker's mark per side. Each mark shall fit into a 150mm x 150mm square and, except on a **sail** measured as a spinnaker, shall be totally within a distance from the **tack point** of either 300mm or 15% of the **foot length**, whichever is the greater. The table below gives the greater of these dimensions for most international classes. This limit should be measured in a similar manner to corner **reinforcement**.

Limit of Sailmakers Mark from tack		
Class	Mainsail	Headsail
Cadet	300	300
Contender	405	—
Dragon	520	530
Enterprise	400	300
Etchells	530	380
Europe	410	—
Finn	490	—
Fireball	425	300
5-0-5	430	345
Flying Dutchman	425	520
FJ	365	300
Flying Fifteen	450	355
470	400	300
420	360	300
H-Boat	450	425
J/24	445	655/435
Lightning	445	350
Mirror	320	300
OK Dinghy	405	—
Optimist	300	—
Snipe	381	300
Soling	480	400
Star	610	337
Tempest	510	375
Tornado	355	300
Vaurien	330	300
Yngling	390	300

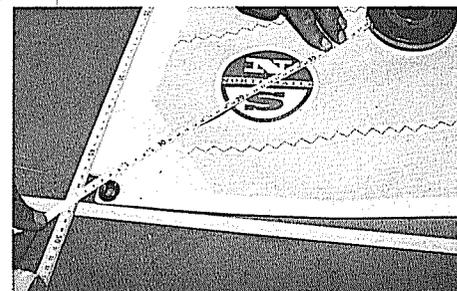


Figure 19. Measuring limit of sailmakers mark

**B.10 Certification Marking
(ERS C.6.3)**

B.10.1 SAIL BUTTONS AND LABELS

Some classes require all **sails** to carry a CA sail button or label. These are a means of raising additional revenue and can normally be purchased from the association.

Where the **class rules** lay down a requirement for sail buttons or labels no **sail** shall be accepted by a measurer unless the button or label is securely attached to the **sail**.

Buttons and labels are not transferable from one **sail** to another and therefore the measurer, when satisfied that the **sail** complies with all the relevant rules, should sign or stamp across the button or label and onto the **sail**. This is in addition to the normal sail **certification mark**. It follows from this that a measurer should refuse to sign a **sail** where the button or label already has a signature across it.

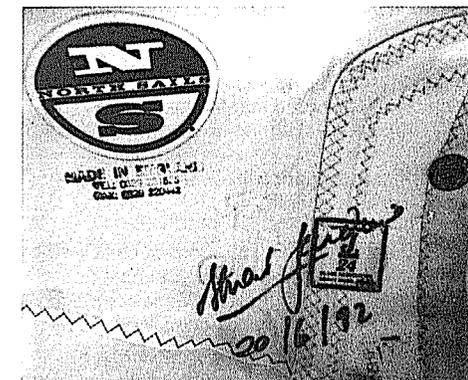


Figure 20. Mainsail tack with Sail Label and Measurers Certification Mark

B.10.2 SAIL CERTIFICATION MARKS (ERS C.6.3)

When satisfied that a **sail** complies with all rules, the measurer is required to **certification mark** it. This is undertaken in different ways in different countries. In Germany, for example, the **certification mark** takes the form of a sail button marked DSV (Deutscher Segler-Verband). Other countries use **certification mark** labels or stamps.

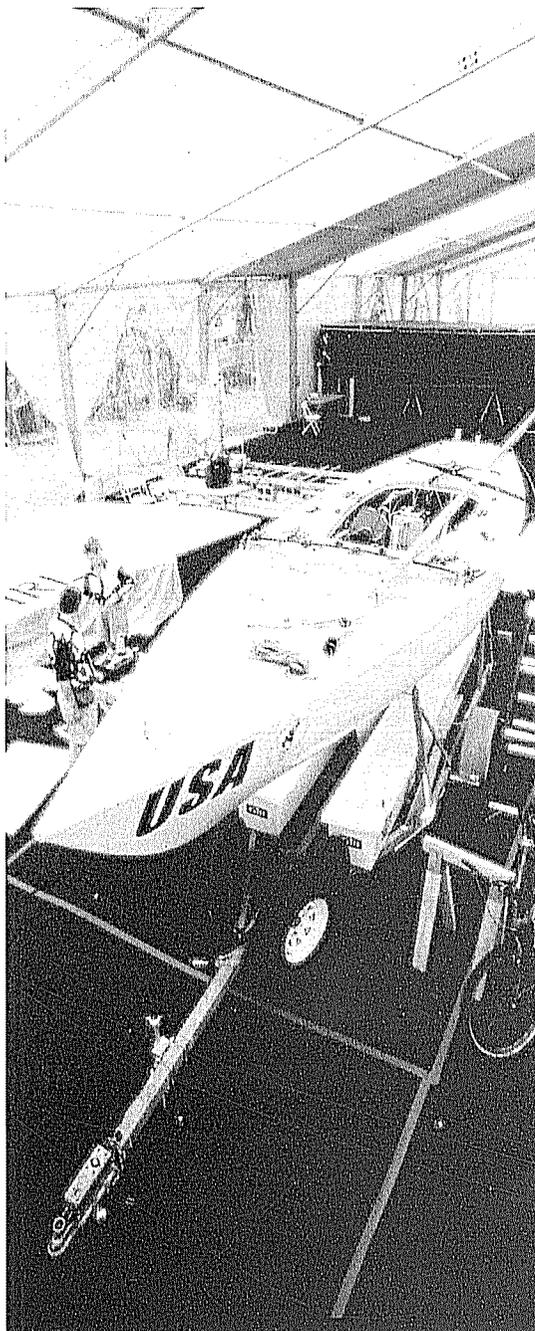
In the absence of any specific national or class requirements, the measurer should sign and date the **sail** near the tack on mainsails and headsails and near the head on spinnakers. **Event measurement** marks should be at the clew. In addition, to enable a particular **sail** to be identified in the future, if it is not marked with a manufacturer's serial number then the measurer should add one. Also, if **class rules** limit the number of **sails** permitted to be used by a single **boat** then, to prevent the swapping of **sails** between **boats**, the measurer should add a sail or plaque number to the **mark**.

The type of pen used for marking is very important, as the mark has to remain visible for several years. Ordinary ball point pens are not adequate and neither are ordinary felt tip pens. Laundry markers or permanent markers, such as Pentel N50, Edding 750 - which also comes in white for deleting sail numbers - or Papermate Permanent Marker are usually satisfactory, but it is recommended that a rag be marked with the pen intended to be used, and then thoroughly washed in very hot water to see whether the mark remains.

Most of these pens will also mark film **sails** satisfactorily, provided that the ink is given time to dry and care is taken not to abrade the mark.

No **certification mark** will remain for long if marked on a damp **sail**.

A measurer should keep a record of **sails certification marked**, detailing the date and serial number of each against the sail or plaque number of the **boat**. In addition, if required by **class rules**, this information should also be added to the measurement **certificate**.



PART C - Event Measurement

C.1 Introduction

In this part of the guide the term **event measurement** refers to the measurement, inspection, checking and/or control of equipment undertaken at an event solely in support of the event. It does not include any initial measurement necessary to obtain a **certificate** or **certification mark** which might otherwise be a requirement of **class rules**. Care should be taken not to confuse **event measurement** with initial, **fundamental measurement**, as a measurer's authority and channel of communications in each case are very different.

Although **event measurement** can encompass the complete **boat**, this guide deals mainly with the measurement of **sails**. If more than just sails are to be measured then the recommendations given in this guide should be included as an integral part of the full measurement planning and strategy.

C.2 Event Measurer's Authority

Event measurers obtain their authority solely from the race committee of the event at which they measure (RRS 78.3).

Official measurers and **International measurers** have no authority to undertake **event measurement** unless specifically appointed for the task by the race committee. ISAF appeal case 123 refers.

Should an NA or CA wish one of its measurers to be involved in **event measurement** then it should ask the race committee to appoint him well in advance of the event.

Although it is common practice with a number of classes for initial measurement to be undertaken just prior to a major event, it is wise for such measurement to be undertaken by a measurer other than the **event measurer**. To act in both capacities creates a conflict of authority. It follows that where an **event measurer** is presented with an item of equipment which he initially measured, then, if possible, he should pass the item to another **event measurer** for checking.

An appointed **event measurer** is under the sole

jurisdiction of the race committee, to which, in the first instance, all formal reports should be made (RRS 78.3).

Should an **event measurer** be in any doubt as to the application of or compliance with a rule or measurement instruction, the question should be referred to the NA or its delegate for the class in the country where the event takes place (ERS H.1.4). The measurer should also advise the race committee.

C.3 Class Association Authority

A CA has no direct authority or jurisdiction over **event measurement** except in the capacity of an organising authority or part of an organising authority (RRS 87.1). A **certification authority** has no power to invalidate or withdraw the measurement **certificate** of a boat while it is competing in an event. ISAF appeal case 123 refers. /S7
plw.

C.4 Racing Rules

The racing rule with most relevance to **event measurement** is RRS 78.3. This is reproduced below.

When a measurer for an event concludes that a boat does not comply with her class rules, he shall report the matter in writing to the race committee, which shall protest the boat.

C.5 Event Measurer's Responsibility

RRS 78.3 gives **event measurers** initial authority for determining whether or not an item complies with **class rules**. This authority is only held while event measuring.

If the measurer formally concludes that an item does not comply, he has no alternative other than to report the matter in writing to the race committee which shall protest the boat.

In most cases it is unlikely that a protest committee will take action against a boat until after it has raced and so, in reality, an **event measurer's** strategy in dealing with a boat found not to comply will differ depending upon

whether he is acting before or after the boat has raced.

PRIOR TO RACING

Prior to racing, and in the case of a series this should be taken to mean the first race of the series, an **event measurer's** prime responsibility is to achieve a state where all **sails** comply with the rules.

In line with this responsibility, if a measurer establishes non-compliance then he should request correction. It is only after a measurer has made such a request and when the defect is not corrected, that he should formally report the matter to the race committee.

In other words, prior to racing the **event measurer** should actively endeavour to achieve rule compliance, but be conciliatory, with the interests of the competitors in mind.

AFTER THE START OF RACING

After racing has started, an **event measurer's** prime responsibility is to judge compliance when required to do so by the actions of a competitor or by the race or protest committee.

When an **event measurer** is given the authority by the race committee to undertake spot checks, care should be taken in the choice of the items to be checked particularly if these were not measured prior to racing. Measurers should not seek to check items where non-compliance could lead to disqualification for a minor, non-performance or non-safety related infringement or because of a failure on the part of a previous measurer. If a competitor deliberately cheats then the item will either be obvious, in which case it is incumbent on another competitor to protest, or so obscure that it is unlikely to be found by random spot checks.

Therefore, after racing has started the **event measurer** should be a reactive policeman in a similar manner to a Juror.

C.6 Event Measurement Planning

Pro-active **event measurement** of **sails** should be undertaken prior to the first race. Subsequent **sail** measurement will be reactive and, apart from ensuring that some measurement facilities are available, cannot be planned.

Planning for pre-event measurement is usually a matter of 'horse trading' between a CA, measurement authority, organising authority and the **event measurer** as to the amount of time, help and money available for the job. Before planning is started, the **event measurer** should open lines of communication with these organisations and continue to consult them on all matters of planning and resources. This dialogue will also highlight measurement concerns and areas where measurement data is needed, and may be important in cases where rule interpretations are required.

Consultation should be started in sufficient time to enable the **event measurement** requirements to be included in the Notice of Race and Sailing Instructions (see Appendix III & IV).

C.7 Sail limitations

It is important to know whether or not the event will be subject to sail limitations where each boat is permitted to use a limited number of mainsails, headsails and spinnakers. Sail limitations will help to provide an estimate of the number of **sails** to be measured and will also mean that limitation stamping has to be undertaken as a priority measurement task, with appropriate rubber stamps and ink pads available. If sail limitations are not in force then an indication of the likely number of **sails** each boat will use will be required. This will vary from class to class.

C.8 Time, people and money

Start the planning process by calculating the amount of time needed to measure all **sails** fully.

Apply the expected number of entries and the number and type of **sails** each is likely to use to estimates of time needed for measurement as given in the tabulation below.

For example - if there are likely to be 50 boats each with two mainsails, two headsails and two spinnakers then the total time will be:-
 $(50 \times 2 \times 10\frac{1}{2}) + (50 \times 2 \times 7) + (50 \times 2 \times 7\frac{1}{2}) = 2,500$ mins

Increase this time by .20% to allow for problems.

$2500 \times 1.2 = 3,000$ mins i.e.. 50 hours

This estimate can be used to assess the time and the number of measurers/helpers needed.

A normal **event measurement** day is 10 hours (600 minutes) and the measurement team needed to measure each **sail** will consist of a measurer and a helper. (The owner/competitor should not be included as the helper).

Taking the 3,000 mins requirement from the above example and dividing this by the 600 mins in a measurement day would give 5 days using one measurement team or 1 day using 5 measurement teams or any variation in between.

If it is not possible to achieve the day/team requirement then the extent of measurement will need to be reduced until a balance is reached. This should be undertaken by omitting the measurement of the least performance related items as listed in the tables below. Omit items from the bottom of each table first and move up the lists omitting items until the balance is reached.

Note that limitation stamping must not be omitted if the event is subject to sail limitation rules.

Whatever is finally decided regarding measurement time and the number of measurers/helpers, this must be agreed with the organising authority and referred to in the Notice of Race and Sailing Instructions (see Appendix III & IV).

Each of the following tables lists individual **sail** measurements in the order in which measurement should be undertaken together with the approximate time needed for each. The times assume template measurement for mainsail and headsail and batten measurement for spinnakers with all measurement undertaken on tables.

MAINSAIL	Mins
Stamping and recording	2
Leech Length	
Half Width	
Three-quarter Width	
Quarter Width	
Top Width	2
Cloth Type	
Cloth Weight	1
Upper Batten Pocket Position	
Upper Batten Pocket Length	1/2
Primary Reinforcement at Corners	
Primary Reinforcement elsewhere	
Secondary Reinforcement at Corners	
Secondary Reinforcement elsewhere	1
Lower Batten Pocket Position	
Lower Batten Pocket Length	1/2
Intermediate Batten Pocket Position	
Intermediate Batten Pocket Length	1/2
Tabling	
Seams	
Window area	
Window Position	
Class Insignia	
Sail Numbers	
Sail Makers Mark	3

HEADSAIL	Mins
Stamping and recording	1
Luff Length	
Leech Length	
Foot Length	
Foot Median	
Luff Perpendicular	
Top Width	2
Cloth Type	
Cloth Weight	1
Primary Reinforcement at corners	
Primary Reinforcement elsewhere	
Secondary Reinforcement at corners	
Secondary Reinforcement elsewhere	1
Tabling	
Seams	
Window area	
Window Position	
Sail Makers Mark	2

SPINNAKER	Mins
Stamping and recording	1
Leech Length	
Foot Median	
Foot Length	
Half Width	
Three-quarter Width	
Quarter Width	3
Cloth Weight	1
Primary Reinforcement at corners	
Secondary Reinforcement at corners	1/2
Tabling	
Seams	
Sail Numbers	
Sail Makers Mark	2

C.9 Measurer's Fees

Any fees or expenses required by the measurers are the responsibility of the organising authority. It is important that agreement on this point is made prior to the event. The **event measurer** should not assume payment or expect to cover costs direct from competitors (see A.3).

C.10 Facilities

Event **sail** measurement should be carried out under cover in good conditions of light, without wind or draughts. Ideally measurement should be carried out on tables. These should be about a metre high with a single flat working surface, although separate tables with their legs taped together will often suffice. Measuring on tables eliminates the need to bend down and to kneel and thus minimises the fatigue associated with **sail** measurement. If tables are not available then a gymnasium or dance floor is a good measuring surface. If the only available floor is concrete this can be covered with polythene sheeting taped down over the measurement templates. Measuring on grass will not give satisfactory results.

Allow sufficient room for all measurement teams to be working simultaneously.

A table and chairs should be provided for each measurement team and food and drink should be available at normal times.

C.11 Preparation

A. DOCUMENTATION

In addition to the RRS, ERS, **class rules**, measurement forms, interpretations and the Guide to Sail Measurement etc, an event measurement form, a measurement log and a sail number change request form will be needed.

The event measurement form, issued to competitors upon registration, should detail the boat and its sail and plaque number (taken from the **certificate**) and give advice as to where and when to attend for measurement, the number of **sails** permitted, the state in which they should be presented, and a section enabling the **event measurer** to record measurement details and stamp. The final part of the form, the declaration, should be signed by the competitor upon completion of measurement. This declaration officially confirms the items marked and that they will not be changed during the event without the prior approval of the Jury.

The measurement log, which is often a simple exercise book, should be used by the measurer to record the number of **sails**, their serial number, manufacturer etc. against each of the boats competing in the event. It is recommended that at least one separate page is used for each boat and, within the time available, as much relevant information as possible is recorded.

The sail number change request form should be a proforma for issue to competitors wishing to request the permission of the race committee to use **sails** displaying different sail numbers from those required by their **certificate** and **class rules**. This is a request for a dispensation under RRS 77 & RRS Appendix H. These forms are not specifically related to measurement but do help to reduce time and are convenient for competitors.

Illustrations of typical documentation is given in the Appendix V & VI.

B. SETTING OUT

Event **sail** measuring to the ERS should be undertaken using templates and measuring battens for small and medium size **sails**. Large **sails** should be measured with steel tapes.

C. MAINSAILS AND HEADSAILS

CAs will often have ready made mylar or similar area check templates which, if possible, should

be used. These can be laid flat on the measuring surface, taped or pinned down and checked against the **class rules** for accuracy using **fundamental measurement** procedures.

If ready made templates are not available they can be created using masking tape directly on the measuring surface. Figure 22 illustrates a typical mainsail tape template. If measurement is to be undertaken on a polythene sheet then the masking tape should be fixed to the surface below the sheet. Use actual **sails** to help position and lay out templates.

D. SPINNAKER

Because of the difficulty in laying spinnakers flat, it is not advisable to measure these using templates.

For small sized spinnakers measurement battens are recommended. If these are already available from the CA then the dimensions should be checked prior to use. Alternatively it is quite easy to make suitable battens, marking the dimensions with felt tipped pens.

For large spinnakers, measurement with a steel tape using **fundamental measurement** procedures is recommended.

E. REINFORCEMENT AND SAIL NUMBERS

For **reinforcement** and sail number sizes, perspex or rigid polythene transparent templates may be used. These can be placed over the item being measured and any deviation in size seen through the template.

F. BATTEN POCKET LENGTHS AND WIDTHS

Batten pocket length, inside and outside, and width may be checked using measurement battens similar to those used for spinnaker measurement.

G. OTHER EQUIPMENT

In addition to templates and battens, equipment recommended for **fundamental measurement** should also be available.

C.12 Undertaking Measurement

C.12.1 PRIOR TO RACING

A. CERTIFICATE AND INITIAL MEASUREMENT ENDORSEMENT CHECKS

Prior to measurement, checks should be made

to verify that the sail number displayed on a **sail** corresponds with that of the boat and also that the **sail** possesses an authentic initial **certification mark**.

If the sail number is different from the boat, the competitor should be asked to complete a sail number change request form for submission to the race committee. (See Appendix V).

If a **sail** does not possess an authentic initial **certification mark** as required by most **class rules**, it should not be measured. The competitor should be asked to present an alternative **sail** or to arrange for independent initial measurement prior to resubmitting the **sail** at a later time.

Event measurers should be aware of the common misunderstanding that a **sail** has been measured and **certification marked**, usually at a previous event, when in fact such was purely check measurement. Sometimes event limitation stamps have been marked at the tack and not the clew contrary to ISAF recommendations.

B. LIMITATION STAMPING

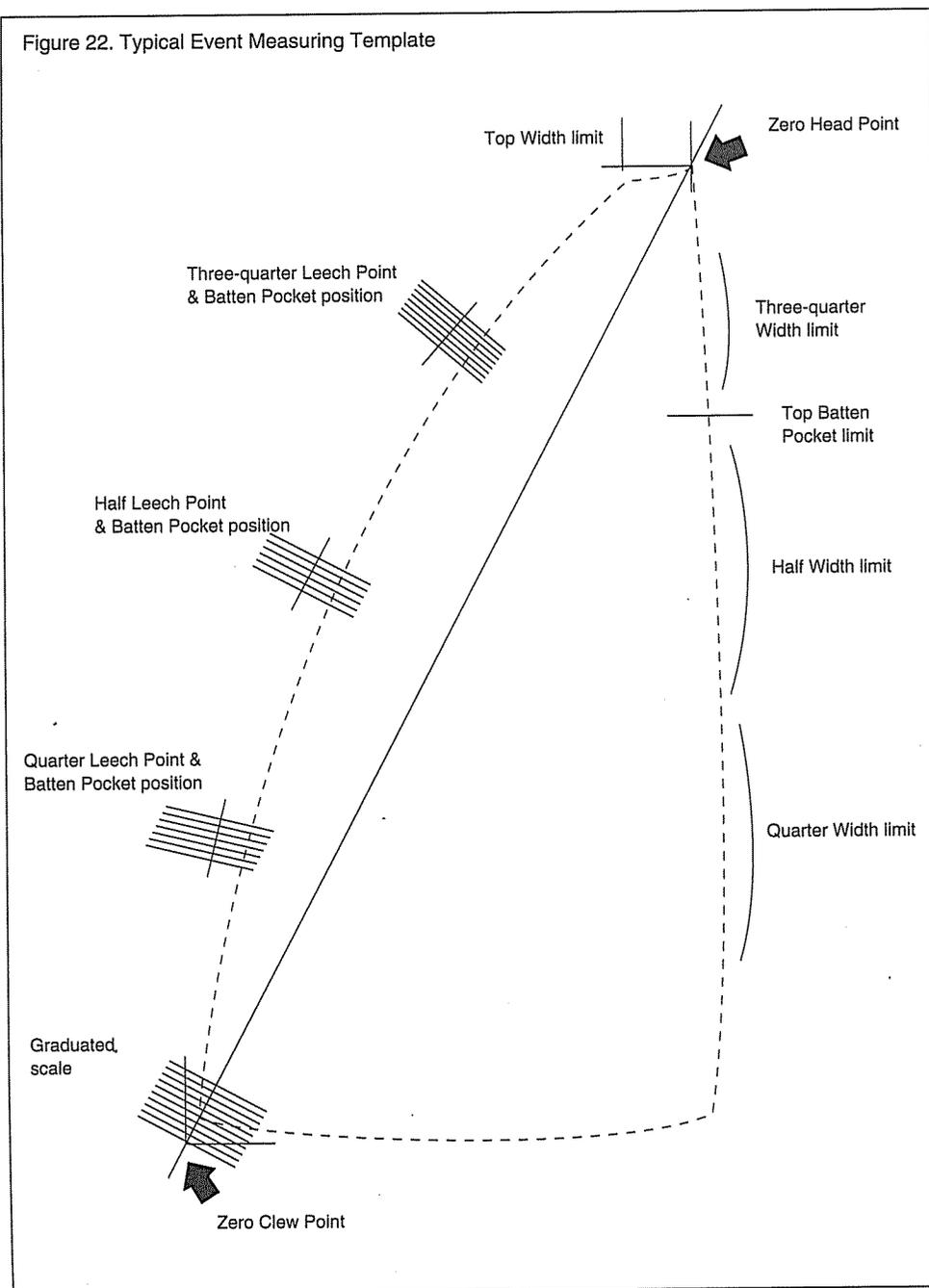
Where the event is subject to sail limitations each sail to be used should be stamped prior to the first race.

Stamping should be undertaken only when the measurer is satisfied that the **sail** complies with all pre-event measurement requirements. The stamp should be positioned at the clew in



Figure 21. Typical Sail Limitation Stamp

Figure 22. Typical Event Measuring Template



addition to which, on headsails, the sail number of the boat should be added next to the stamp to enable the **sail** to be attributed to the boat when checking limitation stamps during the event.

The ink and pens should be as used for initial sail **certification marks**, although the stamp will probably be to a unique design and if possible state 'sail limitation stamp'. See Figure 21.

C. MAINSAIL MEASUREMENT

When checking a measurement by template, the **sail** shall be pulled with sufficient tension to remove the wrinkles across the line of the measurement, as specified in ERS H.4.1.

The **sail** should be laid on the measuring template so that the **head point** is on the template's zero head point and the **clew point** is on the graduated scale of the template leech line in the area of the clew. Use the normal sail measurement batten to determine corner points if necessary. The measurer should be at the clew with helper at the head.

The measurer should advise the helper of the gradation upon which the **clew point** rests and the leech points marked on the **sail** at the corresponding leech gradations.

Lengths and widths may now be measured and the **batten pocket** positions and **top width** checked. If any of these is close to the rule limits then it should be rechecked using **fundamental measurement** procedures.

Cloth type and weight are checked using a standard thickness micrometer and feeler gauge (see B.2).

The measurement helper can next check the inside and outside **batten pocket** lengths and widths, using measurement battens, at the same time as the measurer checks **reinforcement** and sail number using a perspex template.

Any remaining measurement can be carried out using either perspex templates or battens as appropriate.

D. HEADSAIL MEASUREMENT

The headsail should be checked in a similar manner as the mainsail.

E. SPINNAKER MEASUREMENT

Due to difficulty in laying a spinnaker flat, it is not

recommended that template measurement is used. Accordingly, if **widths** and the **foot median** are to be measured, it will be necessary to fold the sail to find **leech** and **mid foot points**. This should be done first, with the points being clearly marked on the **sail**.

Leech length and **foot median** should be checked against the measuring batten. The helper should zero the batten at the **head point** and the measurer check the **sail** at the other end. The batten should be placed on top of the **sail** which should be pulled with the tension as required by ERS H.4.1.

The **sail** may now be moved around under the measurement batten to enable the **widths** to be checked.

Cloth weight, **reinforcement**, sail numbers and any other items may be checked in a similar manner as for the mainsail.

F. ACTION IN CASES OF NON-COMPLIANCE

During pre-race measurement, if a measurer concludes that a **sail** does not comply with rules, then in the first instance, the competitor should be requested to rectify the item either by alteration or by the submission of an alternative **sail**. If the competitor challenges the accuracy of the **event measurement**, the **sail** should be remeasured, preferably by another measurer, using the **fundamental measurement** procedure. If the **sail** still proves to be unsatisfactory (or in cases of doubt) the competitor should again be requested to rectify the item. If this request is still refused, the measurer should make a report to the race committee in accordance with RRS 78.3.

G. RECORDING

Upon completion of the measurement and prior to stamping the **sail**, the event measurement form should be completed and details of the **sail** entered into the measurement log. It is important that the **sail** can be uniquely identified and so, if it does not possess a manufacturer's serial number or an initial measurer's unique number, the **event measurer** should mark such on the **sail**.

H. IMPOUNDING OF SAILS PRIOR TO RACING

It is sometimes the case that, subsequent to measurement but prior to the first race and where sail limitation is in force, a competitor

decides to change his choice of **sails** and requests the measurement of an alternative. In such cases, prior to measuring the replacement, the competitor should present one of the previously checked and event stamped **sails** for impounding for the duration of the event. The impounded **sail** should not be returned until after the last race.

C.12.2 AFTER RACING HAS STARTED

The only **sail** measurement that should be undertaken after racing has started is limitation stamp checking and any measurement required by the race or protest committee. In the latter case it is recommended that this is undertaken using the **fundamental measurement** procedures.

C.13 Notice of Race & Sailing Instructions

The pre and post race measurement requirements should be included in the Notice of Race and Sailing Instructions. See Appendix III & IV for suggested wordings.

C.14 Measurement Protests & Appeals

A. WHO CAN PROTEST?

A boat and the race committee may protest a boat in respect of **class rule** and measurement/rating **certificate** infringements. An NA, CA and an **event measurer** have no right to protest. RRS 60.1, 60.2 and 78.3 refer.

B. MAKING A REPORT UNDER RRS 78.3

Where a measurer makes a report to the race committee in accordance with the requirements of RRS 78.3, such report should be in writing, giving details of the sail number and plaque number, name and owner of the boat in question, together with details of the **class rule** or **rules** and interpretations considered defective and at what time these were noted as being defective, what action if any has been undertaken by the owner or representative and whether or not, in the opinion of the measurer, the defect was in existence before and/or after a race.

In receiving a report under RRS 78.3 the race committee has no alternative other than to

protest the boat. A measurer should bear this in mind and may consider discussing the matter informally with the chairman of the protest committee before making a formal report, particularly if the deficiencies are in respect of many boats.

C. GIVING EVIDENCE

When asked to give evidence to a protest committee a measurer should restrict his comments to fact and not enter into discussions as to the meaning or interpretation of either class or racing rules. It should also be noted that convention and precedent only exist in cases of official rule interpretation by the authorised authority or racing rule appeal cases. The fact that something was permitted at the last major event of the class does not mean that it should be considered as a precedent for future events.

D. DAMAGED EQUIPMENT

A competitor will sometimes request permission from a protest committee to use an alternative **sail** when that previously measured and limitation stamped has been damaged. The measurer may be asked to give evidence as to whether or not, in his opinion, the extent and cause of the damage justifies a replacement.

In such a case the measurer should decline to give evidence respectfully pointing out that the cause and extent of damage to the **sail** and its possible future use is not a matter dealt with by **class rules** or measurement but a matter for subjective consideration. The protest committee itself may well be more qualified to judge these matters than an **event measurer**.

E. CLASS RULE INTERPRETATION OR APPLICATION

Where, under RRS 64.3(b), a protest committee is in any doubt about the meaning of a **class rule**, it should refer the question, together with the facts found, to the authority responsible for interpreting the rule. This authority will usually be the ISAF, an NA, or a CA technical committee. It is not an **event measurer**.

F. ACTION UNDER RRS 69 - GROSS MISCONDUCT

Action or the promotion of action under RRS 69 is a very serious matter and should only be entered into after due consideration of all the factors involved in the alleged gross misconduct.

To date there have only been two types of incidents where such action has been undertaken involving measurement or a measurer.

The first was where an **event measurer**, whilst carrying out his duties, was verbally abused by a competitor. In such a case only the measurer can judge the degree of abuse and whether or not this warrants promotion of action under this rule.

The second was where there was an undisputed case of either measurement cheating or fraudulent **certification marking**. In such cases, provided that there is no doubt whatsoever, the measurer should not hesitate to promote the initiation of action under RRS 69.

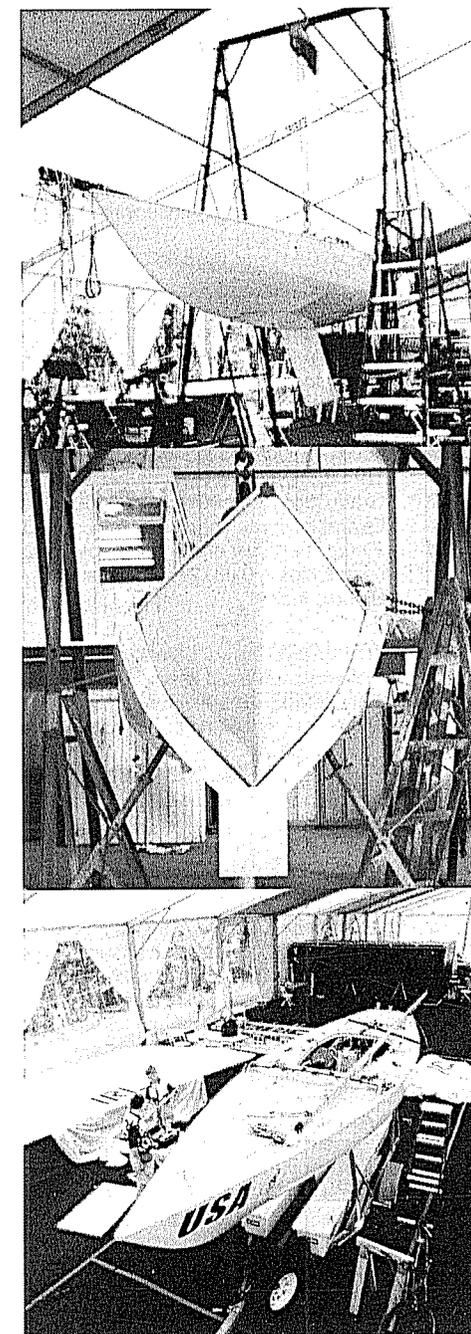
G. APPEALS

The right of appeal is dealt with by RRS 70. This permits a race committee to appeal the decision of a jury provided that the race committee was a party to the protest. This would be the case if action had been taken under RRS 78.3 and the protest hearing was not undertaken by the race committee itself.

An **event measurer** and a CA have no right of appeal.

C.15 Post Event Action

Subsequent to the event, the **event measurer** should ensure that all impounded sails and any **certificates** retained for the duration of the event are returned to their rightful owners. In addition, a written report giving details of the extent of measurement, any problems encountered and any subsequent action take, should be prepared and passed to the NA and CA concerned.



Appendix I

Sail Ply Weight and Thickness Measuring Equipment

SAIL PLY WEIGHING EQUIPMENT

(It is recommended that this equipment is hired.)

A national governmentally approved laboratory type scale, approved to weigh samples to an accuracy of 0.01% to be used in accordance with its manufacturers' instructions.

or
Yield scale type 'E/M' and Sample Cutter 'ERC-2' manufactured by Alfred Suiter Co. of Orangeburg, NY, USA.

SAIL THICKNESS MEASURING EQUIPMENT

Micrometer

The micrometer shall have the following characteristics:

- Ratchet stop
- Measuring surfaces area of 5.25mm² (0.250in²)
- 400gf - 600gf applied to the measuring area
- Throat depth of approximately 21mm minimum
- Graduations to 0.001mm (0.00005in)
- Overall accuracy of plus or minus 0.002mm
- Flatness of anvil and spindle tips = 0.0006096mm or better or a parallelism of anvil and spindle tips = 0.00124mm or better
- Spindle lock

Padded carrying case

Note: A digital readout type is highly recommended to ensure speed and accuracy for regatta measurement.

Standard automobile feeler gauge.

Appendix II

Recommended Dimensional Limits for Sails

The limits of dimension for the items listed below should be determined for individual classes and detailed in **class rules**. To assist classes in determining limits and to reduce cost by standardisation it is recommended that classes choose their limits from those detailed in the tabulation below. Luff and foot lengths are in metres with limits in millimetres.

Luff Length	<3	4	5	6	7	8	9	10	11	12
Primary reinforcement	250	300	300	350	400	400	450	450	500	550
Secondary reinforcement	750	900	900	1050	1200	1200	1350	1350	1500	1650
Flutter Patches	100	100	100	120	140	140	160	160	180	200
Chafing Patches	750	900	900	1050	1200	1200	1350	1350	1500	1600
Seams	15	15	15	20	20	20	25	25	25	30
Tabling	25	30	30	35	40	40	45	45	50	55
Top Width mainsail		100	100	100	150	150	150	150	150	150
Top Width headsail		30	30	30	40	40	50	50	50	50
Foot Length	<3	4	5	6	7	8				
Foot Irregularity	30	40	50	60	70	80				

Appendix III

Typical Inclusion for Notice of Race

MEASUREMENT

Measurement registration and pre-event measurement will be undertaken for each boat at a time and place advised subsequent to receipt of a boat's entry. Not until measurement registration and pre-event measurement has been completed to the satisfaction of the event measurer will a boat be eligible to compete.

A) MEASUREMENT REGISTRATION

Each boat shall register for measurement at the time and place advised by the **event measurer**.

A valid measurement **certificate** will be required to be lodged with the **event measurer** at the time of measurement registration.

Where such a **certificate** is not available and an undertaking to produce it is lodged in accordance with RRS 78.2, this shall be accompanied by a fee of \$100.00. The full amount of this fee shall be forfeited unless a previously issued **certificate**, or a certified copy of it, is submitted before the end of the event.

Where required by **class rules** a current Class Association Membership card/sticker will be required to be produced at the time of measurement registration.

B) EQUIPMENT LIMITATIONS

The following equipment limitations shall prevail. Not more than:-

1 mainsail	1 headsail
1 spinnaker	1 mast
1 boom	1 spinnaker boom
1 rudder	1 centreboard

shall be presented for pre-event measurement.

C) PRE-EVENT MEASUREMENT

Subsequent to measurement registration each boat, its **sails** and equipment intended to be and permitted to be used during the event, shall be pre-event measured as required by the **event measurer**. The boat, its **sails** and equipment shall be presented for pre-event measurement clean and dry and in the condition required by the event measurement form.

All **sails** presented for pre-event measurement shall have been previously measured and **certification marked** as required by **class rules**.

D) MEASUREMENT SPOT CHECKS

Measurement checks may be carried out on any boat, its sails or equipment and at any time during the event.

Appendix IV

Typical Inclusion for Sailing Instructions

1 GENERAL REQUIREMENTS

- 1.1 All boats (including their spars, sails and equipment) entered for the event will be measured in accordance with their class rules and any special rules contained in these Sailing Instructions. In the case of conflict between the class rules and Sailing Instructions, the latter shall prevail.
- 1.2 The Event Measurer (hereafter referred to as the EM), appointed by the Organising Authority, shall have the responsibility for the event measurement.
- 1.3 Measurement registration and pre-event measurement will be undertaken for each boat at a time and place advised upon receipt of a boat's entry. Not until

measurement registration and pre-event measurement has been completed to the satisfaction of the EM will a boat be eligible to compete.

2 MEASUREMENT REGISTRATION

- 2.1 Each boat shall register for measurement at the time and place advised.
- 2.2 A valid measurement **certificate** will be required to be lodged with the EM at the time of measurement registration and may be retained by the EM for the duration of the event.
- 2.3 Where such a **certificate** is not available and an undertaking to produce it is lodged in accordance with RRS 78.2, this shall be

accompanied by a fee of \$100.00. The full amount of this fee shall be forfeited unless a previously issued **certificate**, or a certified copy of it, is submitted before the end of the event.

- 2.4 Where required by **class rules** a current Class Association Membership card/sticker will be required to be produced at the time of measurement registration.

3 PRE-EVENT MEASUREMENT

- 3.1 Subsequent to measurement registration each boat, its **sails** and equipment intended to be and permitted to be used during the event, shall be pre-event measured as required by the EM.

- 3.2 All boats, **sails**, spars and equipment shall be submitted for pre-event measurement in a dry condition and as required by the event measurement form. Any item which is not in such a condition to the satisfaction of the EM will be rejected for measurement.

- 3.3 Only one person representing the boat shall be present during measurement of the hull and equipment. Only one person representing the boat may be present during measurement of the **sails**.

- 3.4 Unless authorised by the EM, repairs or alterations to boats, equipment or **sails** shall not be made in the measurement areas.

- 3.5 All hulls, **sails**, spars and equipment shall carry all the measurement marks, bands, stickers and labels prescribed in the class rules. When specified in the relevant class rules, all sails supplied by competitors shall have been measured and certification marked in accordance with the class rules before being presented for measurement.

- 3.6 Under exceptional circumstances, and provided that the **class rules** permit, a competitor may request in writing a dispensation from the race committee to permit a boat to use sails carrying identifying numbers other than those required by RRS 77 & RRS Appendix H. Such dispensations shall be obtained in writing and lodged with the EM prior to pre-event measurement.

- 3.7 Some items of a boat's equipment, subject to measurement and/or limitation control, will be marked with one or more official measurement control marks. After

the items have been marked the person representing the boat will be required to sign the event measurement form declaring the items which have been marked, and that none of the marked items will be changed during the event without the prior approval of the Jury. If, through wear and tear, a mark starts to become obliterated the fact shall be reported to the EM in order that the mark may be replaced. It is the competitor's responsibility to report this to the EM.

4 EQUIPMENT LIMITATIONS

The following equipment limitations shall prevail. Not more than:-
 1 mainsail 1 headsail
 1 spinnaker 1 mast 1 boom
 1 spinnaker boom 1 rudder
 1 centreboard
 shall be presented for pre-event measurement.

5 MEASURED BOATS AND EQUIPMENT

After a boat has completed pre-event measurement:-
 (i) No alterations shall be made to the boat except for the adjustment of fittings and equipment where such an alteration is an integral part of the design and is permitted by the class rules.
 (ii) No replacement or repair which might effect compliance with class rules shall be made without the prior permission of the EM.
 (iii) Applications to replace measurement control marked items due to damage or loss shall be submitted in writing to the Jury/protest committee.

6 MEASUREMENT INSPECTION AFTER THE START OF RACING

After the start of racing, measurement and measurement control mark checks may be carried out on any boat, its sails or equipment at any time during the event, afloat or ashore.

7 WEIGHING OF WET CLOTHING

Whilst afloat, immediately after a race, the EM may require a competitor to present himself for the weighing of wet clothing in accordance with RRS Appendix J and/or class rules. In such a case the competitor shall act under the direction of the EM.

Appendix V

Request to Display a Sail Number Different from that of the Boat

TO THE RACE COMMITTEE

I (name) _____

request permission to use:- _____

a mainsail displaying the number _____

a spinnaker displaying the number _____

on the boat (class) _____ true sail number _____

for the duration of the event. I confirm that, prior to the first race, I will ensure that no other boat of the class will be competing with sails displaying the same number.

Signed _____ Date _____

For office use:-

Permission granted

Permission not granted

Signed _____ Date _____

Event Measurer informed

Competitor informed

Appendix VI

Event Measurement Form - 470 Class

Boat's Measurement Representative _____

True Sail Number of Boat _____

Sail Number to be displayed on mainsail during event _____

Plaque Number _____

If the two sail numbers above are not the same has the race committee given permission to display the second number? _____

Measurement date and time _____

Measurement will be carried out in two sessions. The first session, which includes your Measurement Registration at the time given above, will be at the Measurement Centre. The time for the second session, which will also be at the Measurement Centre, will be advised to you during the first session.

CONDITION OF HULL AND EQUIPMENT FOR MEASUREMENT**SESSION 1 - LAMBOLEY TESTING AND SAIL MEASUREMENT**

The hull should be clean and dry without centreboard and stripped of all control lines, loose blocks etc. Sails should be clean and dry. No other items will be required for session 1.

Session 2 - Hull and Equipment Measurement

The hull should be clean and dry without centreboard but with all control lines, loose blocks etc. The centreboard should be clean and dry.
The rudder blade should be clean and dry and removed from stock.
The mast should be clean and dry and be fully rigged.
The boom should be clean and dry.
The spinnaker boom should be clean and dry.

This part of the form is to be stamped and completed by the measurers. Upon completion, the boat's representative shall sign the Declaration below and return the form to the Registration Desk.

HULL WEIGHT

Weight kg
Number of correctors
Weight of correctors kg

Stamp A**HULL & EQUIPMENT***Marked Items*

Centreboard Rudder
Mast Boom
Spinnaker Boom

Stamp A or B**SAILS***Marked Items*

Mainsail Headsail
Spinnaker

Stamp C

DECLARATION: I declare that the items marked with an X above have been measurement marked and that none of these items will be changed during the event without the prior approval of the Jury, in accordance with the Sailing Instructions.

Signature _____ Date _____

International Measurers

(See ISAF Year Book Regulation 15)

Name	Class	Tel	Fax	Email
Gunter Ahlers GER	Dragon	+49 40 6320090	+49 40 63200928	100763.105@compuserve.com
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Appendix

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International Class Associations

See Internet site <http://www.sailing.org> for amendments

International Centreboard Boat Class Associations

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