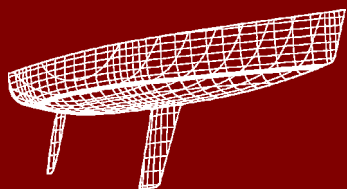




World Leader in Rating Technology

OFFSHORE RACING CONGRESS



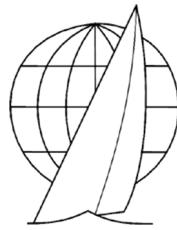
ORC Rating Systems 2009
ORC International & ORC Club

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Margin bars denote rule changes from 2008 version



ORC

World leader in Rating Technology

ORC RATING RULES

ORC *International*
Club

2009

Offshore Racing Congress, Ltd.

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Introduction

ORC Rating systems (ORC International and ORC Club) use the International Measurement System (IMS) as a measurement platform and the ORC Velocity Prediction Program (VPP) to rate boats of different characteristics in size, hull and appendages shape and configuration, stability, rig and sails measurement, propeller installation and many other details affecting their theoretical speed.

Boat ratings are calculated from the predicted boat speeds, calculated for 7 different true wind speeds (6-8-10-12-14-16-20 knots) and 8 true wind angles (52°-60°-75°-90°-110°-120°-135°-150°), plus the 2 optimum VMG (Velocity Made Good) angles: beating (TWA=0°) and running (TWA=180°), which are calculated obtaining an optimum angle at which the VMG is maximized. From the matrix of predicted performances a variety of handicaps are derived, and corrected times can be obtained selecting from a variety of options that range from the single number and triple number scoring based on Time-on-Distance or Time-on-Time to the automated methods such as the simple Performance Line Scoring (PLS) or the more sophisticated Performance Curve (PCS).

The VPP as the base of the ORC handicap system is explained in detail and a simulation software package can be purchased to study the theoretical boat speeds derived from the calculations when using IMS measurements. Details and order forms are available at the ORC website: www.orc.org.

Users of ORC Rating systems should consult the Administrative part of the IMS (Part A) for appropriate use of abbreviations, definitions, and symbols.

Certificates may be issued for ORC International for boats which are completely measured in accordance with the IMS and complying with the requirements of the IMS Rules and Regulations as well as those expressed in this document. In contrast, ORC Club certificates may be issued with less than complete IMS measurement where measurement data may be declared and/or obtained from other sources. The Organizing Authority of any race or regatta will specify whether ORC International or ORC Club certificates are required for entry, but both certificate types can be mixed in any race, being fully compatible.

1. LIMITS AND DEFAULTS

100 General

- 100.1 The IMS Measurement dataset of any boat is processed by the Lines Processing Program (LPP) which calculates hydrostatics and all hull characteristics required by the VPP. The calculations of the main hydrostatic data are explained in principle below, while the exact formulations are defined in the VPP and its documentation.
- 100.2 Default water specific gravity **SG** shall be 1.0253. FA and FF shall be adjusted from the measured freeboards **FAM** and **FFM** depending on the difference between **SG** at the time of measurement and the default value defined above. All hydrostatic calculations are then made using the flotation plane in nominal seawater, i.e. with default specific gravity.
- 100.3 Sailing Trim shall be the plane of flotation derived from Measurement Trim as in 100.2 with the addition of weight to represent crew, sails and gear.
- 100.4 Height of Base of I (HBI) is the calculated freeboard in Sailing Trim at the base of IG and ISP. It is used to establish the height of the center of effort of the sailplan.
- 100.5 DSPM and DSPS are the displacements calculated from the volume resulting from the linear integration of the immersed section areas obtained from the hull lines of the Offsets and the freeboards afloat, adjusted to the standard **SG**, in Measurement Trim and Sailing Trim respectively. DSPM is printed on the ORC certificate.
- 100.6 The Sailing Length (IMS L) is an effective sailing length which takes into account the hull shape along its length and especially at the ends of the yacht, both above and below the plane of flotation in Sailing Trim. L is a weighted average of lengths for three conditions of flotation: two with the yacht upright and one with the yacht heeled. The lengths for the three conditions of flotation from which L is calculated are second moment lengths derived from immersed sectional areas attenuated for depth and adjusted for appendages. The second moment lengths are:
- LSM0 is for the yacht in Measurement Trim floating upright.
LSM1 is for the yacht in Sailing Trim floating upright.
LSM2 is for the yacht in Sailing Trim floating with 2 degrees heel.
LSM3 is for the yacht in Sailing Trim floating with 25 degrees heel.
LSM4 is for the yacht in a sunk condition such that compared to Sailing Trim it is sunk $0.025 \cdot \text{LSM1}$ forward and $0.0375 \cdot \text{LSM1}$ aft, floating upright.
- The LPP calculates LSM's taken from the canoe body without appendages and from the full hull with appendages. The final LSM's are the averages of full hull and canoe body LSM's. IMS L is a fundamental parameter taken into account by the VPP in determining hull resistance and it is calculated as:
- $$L = 0.3194 \cdot (\text{LSM1} + \text{LSM2} + \text{LSM4})$$
- 100.7 The effective beam B is a mathematical expression of beam in which elements of beam throughout the immersed portion of the hull are taken into account with emphasis on beam elements close to the plane of flotation and remote from the ends of the hull. It is derived from the transverse second moment of the immersed volume attenuated with depth for the yacht in Sailing Trim floating upright.
- 100.8 The effective hull depth T is a depth-related quantity for the largest immersed section of the hull. It is derived from the area of the largest immersed section attenuated with depth for the yacht in Sailing Trim floating upright divided by B.
- 100.9 The Beam Depth Ratio BTR is the effective beam divided by the effective hull depth $\text{BTR} = \text{B}/\text{T}$.
- 100.10 The Maximum Draft of the Hull including fixed keel shall be the vertical distance from the Sailing Trim plane of flotation to the lowest point of fixed keel. For a centerboard, when **KCDA** is measured and recorded, the maximum draft shall be decreased by **KCDA**.
- 100.11 VCGD is the vertical centre of gravity distance from the datum line in the hull offset file, while VCGM is the vertical centre of gravity from the measurement trim waterline.

101 Materials

- 101.1 It is intention of the ORC Rating Rules to promote safety, address cost and allow materials that are readily available while prohibiting materials and processes that are not readily available.
- 101.2 The following materials are prohibited:
- a) In hull and deck structures and rudders: High Strength (HS) carbon fibre with modulus exceeding 250GPa.
 - b) In spars with the exception of booms: Cored sandwich construction where the core thickness at any section exceeds the thickness of the two skins.
 - c) Any metal alloys containing titanium with the exception of generally available production hardware items. Titanium is not permitted in lifeline elements (stanchions, pulpits, pushpits etc.)
 - d) No material with density greater than 11,34 kg/m³.
 - e) Pressure applied in the manufacture of hull and deck structures greater than 1 atmosphere
 - f) Temperature applied in the manufacture of hull and deck structures greater than 80°C.
 - g) Aluminium honeycomb cores in hullshell and deckshell structures.
 - h) In hull and deck structures: Plastic foam core of nominal density less than 70kg/m³.

102 Crew Weight

- 102.1 The weight of all crew members on board while racing weighed in light street clothes shall not be greater than the maximum crew weight which may be default calculated as per 101.2 or declared as per 101.3.
- 102.2 The default value for the Crew Weight is calculated as follows:

$$CW = 74.95276 \cdot \left(\frac{DSPM}{LSM0^3} \right)^{0.375} \cdot \left(\frac{RM}{DSPM \cdot MB} \right)^{0.4} \cdot LSM0^{1.55}$$

- 102.3 The owner may accept the default calculated weight, but can declare any crew weight which shall be recorded in the certificate.

103 Hull

- 103.1 Age Allowance (AA) is a credit for age of 0.065% of ratings increase for each year from Age or Series Date to the current rule year up to maximum of 20 years (1.3%).
- 103.2 Dynamic Allowance (DA) is a credit representing dynamic behavior of a boat taking into account performance in unsteady states (i.e. while tacking) calculated on the basis of: Beating Sail Area/Volume ratio, Beating Sail Area/Wetted Surface ratio, Downwind Sail Area/Volume ratio, Downwind Sail Area/Wetted Surface ratio, Length/Volume ratio and Draft/Length ratio.
- It is fully applied to the ratings of Cruiser/Racer, while for the Racing boats it is applied incrementally with only 20% of the full calculated DA applied in the fourth year and a further 20% in each of the following years until full DA is applied in the eighth year.
- 103.3 C/R Adjustment is the credit for the Cruiser/Racer boats calculated from the presence of the heavy items defined in the IMS - Part H due to the higher pitching inertia.

104 Appendages

The longitudinal movement of the center of gravity of a centerboard when it is being raised or lowered shall not exceed 0.06 * **LOA**.

105 Propeller

- 105.1 PIPA shall be the propeller installation projected area calculated on propeller type, installation and measurements.
- 105.2 For twin propeller installation, PIPA is doubled.

106 Stability

- 106.1 Limit of positive stability (LPS) as calculated by the LPP from the measured righting moment shall not be less than 103.0 degrees, except for the ORC Sportboats for which the limit is 90.0 degrees.
- 106.2 Stability Index shall be calculated as follows:

Stability Index = LPS + Capsize Increment (CI) + Size Increment (SI)

$$CI = 18.75 \cdot \left(2 - \frac{MB}{\sqrt[3]{DSPM/64}} \right) \quad SI = \frac{\left(\frac{12 \cdot \sqrt[3]{DSPM/64} + LSM0}{3} \right) - 30}{3}$$

DSPM ó Displacement in measurement trim calculated by the VPP

LSM0 ó Second moment length calculated by the VPP

CI shall not be taken as greater than 5.0 nor less than -5.0.

SI shall not be taken as greater than 10.0.

Stability Index for water ballast yachts is calculated with the ballast tankage full on one side, empty on the other and for canting keel yachts with the keel fully canted.

- 106.3 Minimum Stability Index may be limited by the Notice of Race and Sailing Instructions for the Offshore Special Regulations Categories 0, 1 or 2 events, but other limits may also be set for any particular event.

Offshore Race Category:	0	1	2
Minimum Stability Index	120	115	110

- 106.4 For a boat with water ballast or canting keel, the Ballast Leeward Recovery (BLR) Index represents such a boat's relative ability to recover from a knock down with sails aback, i.e., knocked down with all water ballast or canting keel to leeward. BLR Index shall be calculated as follows:

$$BLRIndex = \frac{RA90 \cdot DSPS}{6 \cdot SA \cdot CE} + 0.5$$

Where the following values taken with full leeward cant or leeward ballast tankage full, windward empty are calculated by the VPP, in metric units:

RA90 - Righting arm, 90 degrees heel, sailing trim

SA - Rated sail area

CE - Center of Effort of the rated sail area

- 106.5 Minimum BLR Index may be limited by the Notice of Race and Sailing Instructions for the Offshore Special Regulations Categories 0, 1 or 2 events, but other limits may also be set for any particular event.

Offshore Race Category 0: Minimum BLR Index = $0.90 + 0.007 \cdot (LSM1 - 5)$

Offshore Race Category 1 & 2: Minimum BLR Index = $0.75 + 0.007 \cdot (LSM1 - 5)$

107 Righting Moment

- 107.1 When an inclining test is performed with weights that are transferred once from starboard to port side and the angle recorded four times in succession, the measured righting moment shall be calculated as follows:

$$RM_{(1-4)} = W_{(1-4)} \cdot 0.0175 \cdot WD \cdot \frac{PL}{PD_{(1-4)}}$$

$$RM_{measured} = \frac{RM_1 + RM_2 + RM_3 + RM_4}{4}$$

- 107.2 When an inclining test is performed with four weights that are transferred one by one from starboard to port side, the measured righting moment shall be calculated as follows:

$$RM_{measured} = WD \cdot PL \cdot \frac{0.0175}{SLOPE}$$

where

$$PL = \frac{PLM}{(1 + GSA/RSA)}$$

$$SLOPE = (4.0 \cdot \text{SUMXY} - \text{SUMY} \cdot \text{SUMX}) / (4.0 \cdot \text{SUMXSQ} - \text{SUMX}^2)$$

SUMX - the sum of the inclining weights $W1 + W2 + W3 + W4$

SUMY - the sum of the pendulum deflections $PD1 + PD2 + PD3 + PD4$, referenced to datum point.

SUMXSQ - the sum of the squares of the inclining weights $W1^2 + W2^2 + W3^2 + W4^2$

SUMXY - the sum of the products of the inclining weights multiplied with their corresponding pendulum deflections $PD1 \cdot W1 + PD2 \cdot W2 + PD3 \cdot W3 + PD4 \cdot W4$

The slope of a least squares fit straight line through the inclining weight vs. pendulum deflection is determined iteratively, plotting in turn each of the five possible combinations of four selected data points, as referenced to the fifth point. Of the five alternative plots, that yielding the fit with the highest correlation coefficient determines RM.

- 107.3 For boats with movable boards or drop keels righting moment is corrected to: $RMC = RM + 0.0175 \cdot (WCB A \cdot C B D A + W C B B \cdot C B D B)$. For yachts with fixed keels or centerboards locked to prevent any movement: $RMC = RM$.

- 107.4 Default righting moment shall be calculated as follows:

$$RM_{default} = \left(a0 + a1 \cdot BTR + a2 \cdot \frac{\sqrt[3]{VOL}}{IMSL} + a3 \cdot \frac{SA \cdot HA}{B^3} + a4 \cdot \frac{B}{\sqrt[3]{VOL}} \right) \cdot DSPM \cdot IMSL$$

where all the variables are calculated by the VPP

a0 = -0.00410481856369339 (regression coefficient)

a1 = -0.0000399900056441 (regression coefficient)

a2 = -0.0001700878169134 (regression coefficient)

a3 = 0.00001918314177143 (regression coefficient)

a4 = 0.00360273975568493 (regression coefficient)

VOL - canoe body volume

SA - sail area upwind

HA - heeling arm, defined as

$$(CEH_{main} \cdot AREA_{main} + CEH_{jib} \cdot AREA_{jib}) / SA + HBI + DHKA \cdot 0.45$$

CEH - height of centre of effort

DHKA - Draft of keel and hull adjusted

Default righting moment shall not be taken greater than $1.3 \cdot RM_{measured}$ nor smaller than $0.7 \cdot RM_{measured}$.

For movable ballast boats the default righting moment intends to predict the righting moment of the boat without the effect of movable ballast (water tanks empty, or keel on the center plane), is then decreased by a factor $(1 - RM@25_movable/RM@25_tot)$, where $RM@25_movable$ is the righting moment due to the contribution of movable ballast at 25 degrees of heel, and $RM@25_tot$ is the total righting moment at 25 degrees, with keel canted or windward tanks full. For these boats, the max and min bounds are set to $1.2 \cdot RM_{measured}$ and $0.8 \cdot RM_{measured}$ respectively.

- 107.5 The righting moment used in the VPP calculations will be the average between the measured and default RM as follows:

$$RM_{rated} = \frac{RM_{measured} + RM_{default}}{2}$$

- 107.6 If the inclining test is not performed for boats with movable ballast as prescribed in IMS E5 vertical longitudinal and transversal centre of gravity of the water ballast will be calculated as follows:

$$VCG_{wb} = 0.5 \cdot FA$$

$$LCG_{wb} = 0.7 \cdot LOA$$

$$TCG_{wb} = 0.9 \cdot \text{Crew Arm}$$

108 Rig

- 108.1 The upper end of any rigging shall be attached to the mast above a point $0.225 \cdot IG$ above the sheerline, except that there may be a temporary support to the mast near the spinnaker pole when the spinnaker is set.
- 108.2 $P + BAS$ shall not be less than the greater of $0.96 \cdot IG$ or $0.96 \cdot ISP$.
- 108.3 Boom diameter by default shall be $0.06 \cdot E$. If BD exceeds this default, the mainsail rated area shall be increased as defined in 109.2.
- 108.4 Adjustable inner forestays, when fitted, shall be attached to the foremost mast between $0.225 \cdot IG$ and $0.75 \cdot IG$ above the sheerline.
- 108.5 Foretriangle height IM shall be calculated as follows:

$$IM = \left(IG + \frac{IG \cdot (GO - MW)}{J - GO + MW} \right)$$

IM shall not be taken as less than $0.65 \cdot (P + BAS)$.

109 Mainsail

- 109.1 Mainsail rated area shall be the biggest area of any mainsail in the sails inventory calculated as follows:

$$Area = \frac{P}{8} (E + 2 \cdot MGL + 2 \cdot MGM + 1.5 \cdot MGU + MGT + 0.5 \cdot HB)$$

If any of mainsail widths is not measured, it shall be taken as:

$$HB = 0.04 \cdot E \text{ or } 0.152 \text{ m (whichever is greater)}$$

$$MGT = 0.22 \cdot E$$

$$MGU = 0.38 \cdot E$$

$$MGM = 0.65 \cdot E$$

$$MGL = 0.90 \cdot E$$

- 109.2 If BD exceeds its limit set up in 108.3, mainsail rated area shall be increased for $2 \cdot E \cdot (BD - 0.06 \cdot E)$.
- 109.3 The rated MSW shall be the smallest found on any mainsail in the sails inventory. If MSW is not recorded it shall be taken as $0.125 \cdot DSPM / 64$ (lbs) where DSPM is the displacement in cubic feet in measurement trim as calculated by the LPP.

110 Mizzen

Mizzen width defaults and rated area shall be calculated as for the mainsail with corresponding measurements.

111 Jibs (also applying to genoas)

111.1 Jib rated area shall be the biggest area of any jib/genoa in the sails inventory calculated as follows:

$$Area = 0.1125 \cdot JL \cdot (1.445 \cdot LPG + 2 \cdot JGL + 2 \cdot JGM + 1.5 \cdot JGU + JGT + 0.5 \cdot JH)$$

and shall not be taken less than

$$0.405 \cdot J \cdot \sqrt{IM^2 + J^2}$$

111.2 If any of jib widths are not measured, it shall be taken as follows:

$$JGT = 0.125 \cdot LPG$$

$$JGU = 0.250 \cdot LPG$$

$$JGM = 0.500 \cdot LPG$$

$$JGL = 0.750 \cdot LPG$$

112 Mizzen Staysail

Mizzen staysail rated area shall be calculated as follows:

$$Area = YSD \cdot (0.5 \cdot YSMG + 0.25 \cdot YSF)$$

113 Symmetric Spinnaker

113.1 Symmetric spinnaker defaults shall be calculated as follows:

$$SL_{default} = 0.95 \cdot \sqrt{ISP^2 + J^2}$$

$$SF_{default} = 1.8 \cdot \max(SPL; J)$$

$$SMG_{default} = 0.75 \cdot SF_{default}$$

If any of SL, SF is not measured; it shall be taken as default. If SMG is not measured, it shall be taken as SF default. If SPL is not measured it shall be taken as J.

113.2 Symmetric spinnaker default and measured areas shall be calculated using respective default and measured values as follows:

$$Area = \frac{SL \cdot (SF + 4 \cdot SMG)}{6}$$

113.4 Symmetric spinnaker rated area shall be determined as follows:

- If the measured area is greater than default area, the rated area shall be the measured area.
- If the measured area is smaller or equal to default area, the rated area shall be the average between measured and rated areas.
- If there is no spinnaker aboard, rated area shall be 50% of the default area

114 Asymmetric Spinnaker and Code 0

114.1 Asymmetric spinnaker luff shall be calculated as

$$ASL = \frac{SLU + SLE}{2}$$

114.2 Asymmetric spinnaker defaults shall be calculated as follows:

$$ASL_{default} = 0.95 \cdot \sqrt{ISP^2 + J^2}$$

$$ASF_{default} = \max(1.8 \cdot SPL; 1.8 \cdot J; 1.6 \cdot TPS)$$

$$ASF_{default} = 1.6 \cdot TPS \text{ - for Code 0}$$

$$AMG_{default} = 0.75 \cdot ASF_{default}$$

$$AMG_{default} = 0.55 \cdot ASF_{default} \text{ - for Code 0}$$

If any of ASL or ASF is not measured, it shall be taken as default. If AMG is not measured it shall be taken as ASF default. If TPS is not measured it shall be taken as **J + SFJ**.

114.3 Asymmetric spinnaker and Code 0 default and measured areas shall be calculated using respective default and measured values as follows:

$$Area = \frac{ASL \cdot (ASF + 4 \cdot AMG)}{6}$$

114.4 Asymmetric spinnaker and Code 0 rated area shall be determined as follows:

- If the measured area is greater than default area, the rated area shall be the measured area.
- If the measured area is smaller or equal to default area, the rated area shall be the average between measured and rated areas.

114.5 If Code 0 is the only type of spinnaker in the sails inventory it will be rated together with Asymmetric spinnaker tacked on the centre line with defaults defined in 114.2.

2. RULES APPLYING WHILE RACING

201 Ballast, Fixtures and Equipment

- 201.1 The first sentence of the RRS 51 does not apply for yachts with water ballast and canting keel systems and it is modified by adding as non-movable items recorded in the measurement inventory (IMS E2.2) or as heavy items (IMS - Part H).
- 201.2 Unwarranted quantities of stores shall be considered as ballast. Any liquid carried on board in excess of 2.5 liters of drinkable fluid per person per day of racing, in the tanks or in other containers, and any fuel in excess of the quantity needed to motor for 12 hours is not permitted. Race Organizers may waive this requirement by so specifying in the Notice of Race.
- 201.3 Portable equipment, gear, sails and stores may only be moved from stowage for use in their primary purpose. Stowage in this respect is the position for any item of equipment or stores, to be maintained for the duration of a race or series, when such item is not in use for its primary purpose. Note: Moving sails or equipment with the intention of improving performance is prohibited and shall be considered as a breach of RRS 51.

202 Drop Keels and Movable Appendages

If any drop keel or movable appendage is to be locked when *racing* it shall be so locked and the locking device shall be in place.

203 Centerboards

The movement of a centerboard or drop keel while *racing* shall be restricted to one of the following:

- Straight extension or retraction as in a dagger board.
- Extension about a single fixed pivot.

204 Manual Power

RRS 52 does not apply for canting keels and for boats of LOA > 20 m.

205 Rig

- 205.1 Movement of the mast at the step or deck is not permitted, except for a natural movement of the mast at the deck not exceeding 10 per cent of the greatest fore and aft or transverse dimension of the mast.
- 205.2 If the forestay is adjustable it shall not be used to control mast rake.
- 205.3 Mast jack pump shall not be on board.

206 Sails

- 206.1 Exclusive of storm & heavy weather sails required by the Offshore Special Regulations, a boat shall not carry aboard while *racing* more sails of each type than the numbers defined as follows:

GPH	Above 720	720.0 – 615.0	614.9 – 475.0	Below 475.0
Mainsail	1	1	1	1
Genoa	2	3	4	5
Jib	2	2	3	4
Inner jib	1	1	1	1
Spinnakers	3	3	4	4
Mizzen	1	1	1	1

- a) If there are no genoas in the sails inventory the number of jibs allowed on board shall be increased by two.
- b) Inner jib shall have **LPG** of $1.1 * J$ or less and shall be tacked inside another jib or spinnaker.
- c) Spinnakers include: symmetric, asymmetric and Code 0.

206.2 Notice of Race and Sailing Instructions may modify limitations set in 206.1 appropriate to the character of race.

206.3 Operating devices for securing halyards under tension (e.g. halyard locks) shall be permitted only if they can be remotely operated from deck.

207 Jibs (also applying to genoas)

207.1 When a jib is set under a spinnaker or inside another jib and if the jib is trimmed flat along the center line of the boat:

- a) the clew shall not be aft of LP measured from the luff of the foremost jib.
- b) no more than 50 per cent of its area shall fall abaft the foreside of the mast.

207.2 If the jib is set flying, no tack pennant greater than 0.762 m may be used.

207.3 No jib shall be tacked such that the forward end of any batten is aft of the center line of the mast.

207.4 Except when changing sails, two jibs shall not be set with the same tack point.

207.5 A jib may be tacked to the spinnaker pole only in heavy weather when no other sail is set in the foretriangle.

207.6 Jibs may be sheeted:

- a) to any part of the deck or rail
 - b) to a fixed point no higher than $0.05 * MB$ above the deck or coach roof
 - c) to the main boom within the measurement limit according to the IMS F5.4
 - d) to the spinnaker pole in accordance with RRS 50.2
- and shall not be sheeted to any other spar or outrigger.

208 Spinnakers

208.1 Leech lines shall not be adjustable on symmetric spinnakers.

208.2 Spinnakers shall be sheeted:

- a) from only one point
 - b) to any part of the rail or deck
 - c) to the main boom within the measurement limit according to the IMS F5.4
- and shall not be sheeted to any other spar or outrigger.

208.3 Struts, spools or similar devices used solely for the purpose of keeping the spinnaker guy away from the windward shrouds are permitted only when the guy is attached to the pole and shall not to be used for any other purpose.

208.4 Where the asymmetric spinnaker is tacked on the centerline, tack pennants of whatever length could be used. Spinnaker should be sheeted on the same side as the boom, except when gybing or maneuvering. In any case the tack of the spinnaker shall not be moved on the windward side with the help of afterguys and outriggers.

209 Mizzen Staysail

209.1 Mizzen staysail shall be sheeted:

- a) to any part of the rail or deck
- b) to the mizzen boom within the measurement limit according to the IMS F10.1

and shall not be sheeted to any other spar or outrigger.

209.2 The tack or tack pennant shall be secured abaft the point of intersection of the afterside of the mainmast with the main deck and must also be secured directly to and no higher than the rail cap, deck or cabin top (includes dog house top).

209.3 No more than one mizzen staysail shall be set at the same time.

209.4 No mizzen staysail shall be carried on a yawl or ketch whose mizzen is set on a permanent backstay in lieu of a mizzen mast.

210 Penalties

If any of the rules of Part 2 are broken by the crew through no fault of their actions, the penalty imposed may be different from disqualification, including no penalty.

3. CERTIFICATES

301 Certificates

- 301.1 **ORC International certificate** may be issued for a boat completely measured in accordance with the IMS and complying with the requirements of the IMS Rules and Regulations as well as ORC Rating systems.
- 301.2 **ORC Club certificate** may be issued with less than complete IMS measurement where measurement data may be:
- a) Measured in accordance with the IMS
 - b) Declared by the owner. Any declared data may be taken or corrected by the rating authority if there is reasonable doubt about any declared data.
 - c) Obtained from any other source, including photos, drawings, designs, data from identical or similar boats.

302 One Design Certificates

- 302.1 ORC International and ORC Club certificates may be in the form of a One Design certificate where all data affecting a boat's rating are standardized based on the set of measurements for classes having One Design class rules or having all the IMS measurements in close tolerances. In such a case no measurement is needed providing that there is proof that the boat is complying with the One Design Class measurements.
- 302.2 Any change of the One Design class measurements shall render invalid the boat's One Design certificate and a new standard ORC International or ORC Club certificate may be issued.
- 302.3 Data for the ORC International or ORC Club One Design Classes based on their class rules and actual IMS measurements of at least 5 measured boats shall be collected by the ORC to issue One Design certificates, whose data will be made available to the rating authorities when ORC is satisfied that the production of the class is within close tolerances. National rating authorities may issue One Design certificates for the national one design classes in their area when they are satisfied of the measurement data.
- 302.4 One Design measurement data may be changed from time to time due to changes in the Class Rules, IMS Rules, IMS Regulations or ORC Rating systems.
- 302.5 One Design certificates shall have the notation "One Design".

303 Certificate Issuing

- 303.1 Certificates shall be issued by the ORC Central rating office or by the National Rating Offices appointed by the ORC Nominating bodies having a contract with the ORC for using ORC-certified computer software. A levy as determined by the ORC shall be paid for all valid Certificates issued.
- 303.2 National Rating Offices shall be the Rating Authority in their areas and shall issue certificates for the boats normally stationed or racing in their jurisdiction. Measurement data of any boat shall be available and shared with any rating office, particularly when boats change area, owner, sail number, and are requesting certificates to several Rating Offices jurisdictions. Data will not be available to other parties without the written permission of the Designer.
- 303.3 The Rating Office shall have the authority to issue the certificate upon receipt of the measurement data, but when anything that can be considered unusual or against the general interest of the IMS Rule and Regulations or ORC Rating systems is found, the Rating Authority may withhold the certificate pending an examination of the case, and issue a certificate only after approval is obtained from the ORC.
- 303.4 The certificate shall be valid until the date printed on the certificate which shall normally be 31st December of the current year.

- 303.5 A boat shall have only one valid certificate at any one time. The valid certificate shall be only the last issued.
- 303.6 When the rating authority has reasonable evidence that not by her own fault a boat does not comply with her certificate, or that she should never have received a certificate, it shall withdraw the certificate, inform the owner or his representative in writing of the reasons for this withdrawal, re-check the data and
- a) Re-issue certificate if non-compliance may be corrected;
 - b) If non-compliance may not be corrected by the rating authority, the certificate shall be invalidated and the owner or his representative shall be informed in writing.
- 303.7 The Rating Certificates once issued are considered public, and the rating authority shall supply a copy of any certificate to any person upon payment of a copying charge.

304 Owner's Responsibility

- 304.1 The owner or his representative shall be responsible for:
- a) Preparing the boat for the measurement in accordance with the IMS
 - b) Declaring any required data to the measurer
 - c) Ensuring compliance of any measurement data to those printed on certificate. Measurement shall be deemed to comply with the one printed on the certificate if all the measurements are smaller or equal to those on the certificate, except MSW that shall be bigger or equal. Sails shall be deemed to comply if the sail area is smaller or equal to the respective one printed on the certificate.
 - d) Using the boat and equipment as prescribed by the RRS, IMS Rules, IMS Accommodation Regulations and ORC Rating systems.

The owner or his representative shall sign the statement on the certificate: *öI certify that I understand my responsibilities under ORC Rules and Regulationsö.*

- 304.2 A certificate shall be automatically invalidated by a change of ownership. The new owner may request a new certificate with a simple declaration that no changes have been made so a new certificate may be issued without the need of any new measurement. Conversely the new Owner has every right to have his boat re-measured.
- 304.3 Any change of the measurement data requires new measurement an issuing a new certificate. Such a change may be:
- a) Changes of ballast in amount or location or configuration.
 - b) Change of tankage, fixed or portable, in size or location.
 - c) Any changes in the engine and/or propeller installation.
 - d) Addition, removal or change of location of gear or equipment, or structural alteration to the hull that affect the trim or flotation of the yacht.
 - e) Movement of any measurement bands used in sail area measurement, or any changes in spars, spar location or headstay position.
 - f) Any change to the size, cut or shape of the maximum area sails.
 - g) Changes to the shape of the yacht's hull and/or appendages which may change the boat's Age Date in accordance with IMS A2.2(b).
 - h) Changes to spars or standing rigging configuration, including elements of rigging identified as adjustable while *racing*.
 - i) Changes to the other hull measurements in accordance with the ORC 304.
 - j) Any other change of the data in the certificate that affect any rating.

305 Measurement Protests

- 305.1 When, as a result of any pre-race inspection or measurement, it is determined that a boat does not comply with her certificate:
- a) When the non-compliance is considered to be minor and can be easily corrected, the boat may be brought into compliance with her certificate, and, when necessary, a new certificate may be issued. The Measurer shall inform of such correction to the Race Committee who shall approve a new certificate issue.
 - b) When the non-compliance is major (even if it can be corrected) or if it cannot be corrected without requiring significant re-measurement, a boat shall not be eligible to enter a regatta. The Measurer shall inform the Race Committee who shall act in accordance with RRS and inform the Rating authority.
- 305.2 When, as a result of any measurement protest by the boat or by the race committee, it is determined that a boat does not comply with her certificate, the non-compliance shall be calculated as a difference in percentage of GPH:
- a) If the difference is less than or equal to 0.1% the original certificate will be maintained, the protest will be dismissed and the protestor will have to cover any cost involved. RRS 64.3(a) will apply but no corrections are needed.
 - b) If the difference is more than 0.1% but less than 0.25% no penalty shall apply, but a new certificate shall be issued based on the new measurement data and all races of the series shall be rescored using the new certificate data. The Protest will be considered accepted and the protestee will have to cover any cost involved.
 - c) If the difference is 0.25% or more the yacht shall receive a 50% place penalty in any race in which her rating was incorrect. The Protest will be considered accepted and the protestee will have to cover any cost involved and the yacht shall not race again until all non-compliance issues are corrected to the limit defined in a) above.
- 305.3 If a boat's certificate has to be recalculated during a race or series as a result of an error or an omission in the production of the certificate of which the boat owner could not have been reasonably aware, according to 303.6(a), all races of the series shall be rescored using the new data.
- 305.4 The results of a race or series shall not be affected by measurement protests lodged after the prize giving or such other time as the Sailing Instructions may prescribe. Nothing in this paragraph shall bar action under the RRS concerning a boat deliberately altered and shall not limit in any way acts of the Race and Protest Committees against any individual person involved.

4. SCORING

401 General

- 401.1 ORC Rating systems provide a variety of methods for calculating corrected times using the ratings calculated by the ORC VPP and displayed on the ORC International and ORC Club certificates. Selection of the scoring methods depends on the size, type and level of the fleet, type of the race, and local racing conditions and its use is at the discretion of National Authorities or local event organizers, except for the events governed by the ORC Championship Rules.
- 401.2 Corrected time shall be displayed in days:hours:minutes:seconds. When calculating corrected time, the boat's elapsed time shall be translated to seconds, calculations shall be made and results shall be then rounded to the nearest second (for example: 12345.5 = 12346 seconds). This time in seconds shall be then put back in days:hours:minutes:seconds format.

402 Performance Curve Scoring

- 402.1 Performance curve scoring is the most powerful engine of the ORC International rating system. Its unique feature, making it fundamentally different and much more precise from any other handicap system, is its capacity to give and rate different handicaps for different race conditions because yachts do not have the same performance in different wind strengths and directions.
- 402.2 ORC International certificate is providing a range of ratings (time allowances expressed in s/NM) for different wind conditions in the range of 6 ó 20 knots of true wind speed from optimum beat, over 52, 60, 75, 90, 110, 120, 135, 150 degrees of true wind angle to the optimum run.

General Purpose Handicap (GPH) is an average representation of all time allowances used for simple comparisons between boats and possible class divisions. It is calculated as an average of the time allowances of 8 and 12 knots true wind speed for the Circular Random pre-selected course as defined in 402.4(b). GPH is used for simple scoring option "Offshore Time-on-Distance" and it is also printed on the ORC Club certificate.

GPH
578.7

TIME ALLOWANCES							
Wind Velocity	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt
Beat VMG	1006.2	813.7	724.7	683.9	659.7	645.3	635.6
52°	643.5	536.8	485.8	466.4	456.0	449.9	445.1
60°	600.6	510.6	465.5	447.6	439.3	434.1	429.1
75°	569.0	489.6	451.7	429.9	418.3	412.1	404.6
90°	542.9	463.8	434.5	423.8	414.8	398.6	384.5
110°	550.1	472.9	436.1	411.5	395.3	385.9	369.9
120°	581.2	492.4	448.1	421.3	396.7	376.6	354.7
135°	679.6	546.5	480.6	444.0	420.1	397.3	351.8
150°	821.4	642.4	544.5	484.9	448.8	425.1	383.7
Run VMG	948.4	741.7	628.5	554.8	501.6	464.4	418.1
Selected Courses							
Windward / Leeward	995.2	792.7	687.6	627.3	587.9	561.5	532.6
Circular Random	800.3	644.5	561.2	512.9	483.1	463.5	438.7
Ocean for PCS	905.0	708.2	596.9	527.5	481.1	447.9	402.0
Non Spinnaker	888.4	705.7	605.6	546.1	508.9	484.5	455.2

Figure 1 - Time allowances as printed on the ORC International Certificate

- 402.3 When calculating corrected time by the Performance Curve Scoring, a course to be sailed shall be taken as one of the pre-selected courses for which time allowances are given on the certificate, or constructed from the data measured at the racing area.

402.4 Pre-selected courses are:

- Windward/Leeward** (up and down) is a conventional course around windward and leeward marks where the race course consists of 50% upwind and 50% downwind legs.
- Circular Random** is a hypothetical course type in which the boat circumnavigates a circular island with the true wind velocity held constant.
- Ocean for PCS** is a composite course, the content of which varies progressively with true wind velocity from 30% Windward/Leeward, 70% Circular Random at 6 knots to 100% Circular Random at 12 knots and 20% Circular Random, 80% reach at 20 knots
- Non Spinnaker** is a circular random course type (see above), but calculated without the use of a spinnaker

402.5 When the course is constructed the following data shall be taken for each leg: wind direction, length and direction of each leg, and optionally, the direction and rate of the current on each leg. Any leg can be split in sub-legs in case there is a marked shift in wind and/or current direction.

402.6 Percentage of each wind direction, corrected for the tide is calculated from the constructed course data.

402.7 For each course, a boat's performance curve is calculated using the course definition and time allowances given in the certificate.

402.8 The vertical axis represents the speed achieved in the race, expressed in seconds per mile. The horizontal axis represents the wind speed in knots (*Figure 2*). Elapsed time shall be divided by the distance of the course to determine the average speed in seconds per mile.

For that average speed a point on the performance curve shall be determined by interpolation and a respective average wind for that points shall be determined as *Implied Wind*. If the *Implied Wind* point would fall outside of 6-20 knots of wind a respective 6 or 20 knots value shall be used.

Implied Wind is representing the boat's performance on that course. The faster the boat has sailed, the higher the *Implied Wind*, which is the primary index for scoring.

402.9 Corrected times are calculated from the *Implied Wind* using the performance curve of the scratch boat which may be the fastest boat in the fleet or a theoretical *standard* boat (*Figure 3*).

For each boat's calculated *Implied Wind* a point on the scratch boat's performance curve shall be determined by interpolation and a respective average speed in s/NM shall be found at the vertical axis.

Such average speed shall then be multiplied by the course length and final corrected times in seconds transformed to days:hours:minutes:seconds format.

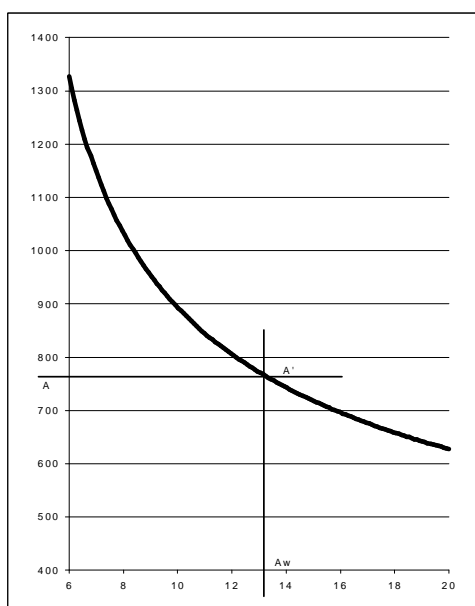


Figure 2: Performance Curve

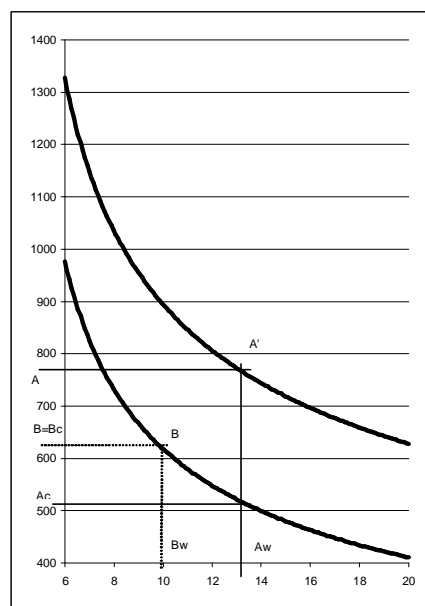


Figure 3: Determining Corrected Times

- 402.10 Implied Windö for the winning boat is normally in the range of real wind strength dominating for the race. However, in case that Implied Windö does not represent fairly the real wind strength during a race, the Fixed Wind method may be used to enter the performance curve with the predominant wind speed in the horizontal axis and getting the appropriate Time allowance in the vertical axis. Such a time allowance is then used as single number Time-on-Distance coefficient as defined in 403.2.
- 402.11 All the formulas for course and performance construction and interpolations together with relevant code for the scoring software are available from ORC and scoring software may be downloaded at the ORC website (www.orc.org).

403 Simple scoring options

- 403.1 ORC International and ORC Club certificates are providing simple scoring options using the ratings determined as single, double or triple number. For any of the simple scoring options, ratings are given for the offshore (coastal/long distance) and for the inshore (windward/leeward) courses.

SCORING OPTIONS						
	OFFSHORE COASTAL / LONG DISTANCE			INSHORE WINDWARD / LEEWARD		
Time On Distance	578.7			650.1		
Time On Time	1.0368			1.0383		
Performance Line	PLT 0.807	PLD 61.4		PLT 1.092	PLD 304.4	
Triple Number	Low 1.0157	Medium 1.3205	High 1.4872	Low 0.7697	Medium 1.0522	High 1.2263

403.2 Time On Distance

Corrected time is calculated as follows:

$$\text{Corrected time} = \text{Elapsed time} - (\text{ToD} * \text{Distance})$$

With Time-on-Distance (ToD) scoring, the coefficient of time allowance of one boat will not change with wind velocity, but will change with length of the course. One boat will always be giving to another the same handicap in s/NM, and it is easy to calculate the difference in elapsed time between two boats needed to determine a winner in corrected time.

Special ToD coefficient calculated with an average crew weight of 170 kg are available for double handed racing as well as calculated with poled jib for non-spinnaker races.

403.3 Time On Time

Corrected time is calculated as follows:

$$\text{Corrected time} = \text{ToT} * \text{Elapsed time}$$

With Time-On-Time (ToT) scoring, time allowance will increase progressively as the wind velocity increases. Course distance has no effect on the results and need not be measured. Corrected time will depend only on the elapsed time, and the difference between boats may be seen in seconds depending of the duration of the races. The longer the race, the larger the handicap.

Special ToT coefficient calculated with an average crew weight of 170 kg are available for double handed racing as well as calculated with poled jib for non-spinnaker races.

403.4 **Performance line**

Corrected time is calculated as follows:

$$\text{Corrected time} = (PLT * \text{Elapsed time}) - (PLD * \text{Distance})$$

With the time coefficient PLT and distance coefficient PLD, two boats may be rated differently in light or heavy wind conditions, and it is possible that one boat is giving a handicap to another in light wind conditions, while the opposite may be true in heavy wind conditions.

403.5 **Triple Number**

Corrected time is calculated as follows:


$$\text{Corrected time} = \text{ToT (Low, Medium or High)} * \text{Elapsed time}$$

The Triple Number system provides a set of three time multiplying factors ToTs (as described above for Time-on-Time) given for three wind ranges:

- Low Range (less or equal 9 knots)
- Medium Range (between 9 & 14 knots)
- High Range (greater or equal 14 knots)

The Race Committee shall signal before the start the wind range to be used for scoring, but it may change this in case of significant change in the weather conditions.

ORC INTERNATIONAL CERTIFICATE SAMPLE

BOAT Name PARAGON OF VIRTUE Sail Nr US-12345		GPH 580.7	HULL Length Overall 12.410 m Maximum Beam 3.630 m Displacement 5,747 kg Draft 2.305 m IMS Reg. Division Cruiser/Racer Dynamic Allowance 0.000% Fwd Accommodation No Hull Construction Light/Other Carbon Rudder No Trim Tab No <hr/> IMS L 10.465 VCGD -0.014 VCGM -0.091 Sink 19.58 kg/mm Wetted Area 26.41 m²		 World Leader in Rating Technology <hr/> 2009 ORC International Certificate		
GENERAL Class TRIPP 40 Designer TRIPP Builder CONCORDIA Series 05.1991 Age 05.1991 Age Allowance 1.105% Offset File PARAVIRT.OFF - 5.6.1992 14:08:00 Measurement by STIMSON - 22.05.1991					Rating Office ORC Sample Run Address 1 Address 2 Address 3 <hr/> Space for Rating Office custom logo		
SCORING OPTIONS							
	OFFSHORE COASTAL / LONG DISTANCE			INSHORE WINDWARD / LEEWARD			
Time On Distance	580.7			646.4			
Time On Time	1.0333			1.0442			
Performance Line	PLT 0.945	PLD 126.7		PLT 1.187	PLD 361.8		
Triple Number	Low 1.0298	Medium 1.3029	High 1.4610	Low 0.7798	Medium 1.0479		
				High 1.2125			
TIME ALLOWANCES							
Wind Velocity	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt
Beat VMG	938.6	778.2	710.7	674.6	652.7	639.3	638.0
52°	603.7	520.8	489.4	474.4	465.0	458.9	454.5
60°	566.1	500.3	471.9	458.5	449.7	443.9	438.3
75°	526.3	473.9	449.8	436.6	428.1	422.1	413.3
90°	517.3	470.1	442.7	422.7	410.3	402.5	390.0
110°	551.6	490.0	456.2	429.9	407.3	388.5	366.5
120°	590.6	509.2	469.3	440.8	416.7	394.8	355.8
135°	700.4	561.8	500.3	465.5	439.1	416.3	372.5
150°	847.5	664.2	560.0	503.2	469.1	443.2	400.7
Run VMG	978.6	766.9	646.0	570.2	516.8	480.5	431.5
Selected Courses							
Windward / Leeward	977.1	787.0	688.2	630.0	591.7	566.3	540.4
Circular Random	790.7	642.8	564.2	518.6	490.1	470.9	446.3
Ocean for PCS	847.4	673.5	577.2	518.5	479.4	451.3	411.0
Non Spinnaker	849.5	683.1	593.2	540.4	507.5	486.0	459.8
Velocity Prediction in Knots for True Wind Speeds							
Wind Velocity	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt
Beat Angles	44.5°	42.3°	39.6°	38.1°	37.2°	36.5°	37.0°
Beat VMG	3.84	4.63	5.07	5.34	5.52	5.63	5.64
52°	5.96	6.91	7.36	7.59	7.74	7.84	7.92
60°	6.36	7.20	7.63	7.85	8.00	8.11	8.21
75°	6.84	7.60	8.00	8.24	8.41	8.53	8.71
90°	6.96	7.66	8.13	8.52	8.77	8.94	9.23
110°	6.53	7.35	7.89	8.38	8.84	9.27	9.82
120°	6.10	7.07	7.67	8.17	8.64	9.12	10.12
135°	5.14	6.41	7.20	7.73	8.20	8.65	9.66
150°	4.25	5.42	6.43	7.15	7.68	8.12	8.99
Run VMG	3.68	4.69	5.57	6.31	6.97	7.49	8.34
Gybe Angles	140.9°	144.3°	151.7°	162.0°	170.2°	174.6°	175.8°
Certificate Number 12345 ORC Ref N/A Issued On 26.12.2008 VPP Ver. beta16 Valid until 31.12.2009							
Crew Weight Declared 815 kg Default* 689 kg							
Special Scoring ToD ToT Double Handed 586.3 1.0234 Non Spinnaker 611.8 0.9807							
Sails Limitations Genoa 4 Jibs 3 Spinnakers 4 Spinnaker configuration Asymmetric-Pole + Code 0							
Storm Sails Areas Heavy Weather Jib 28.87 Storm Jib 10.69 Storm Jib JL 9.51 Storm Try sail 15.27							
Owner Mr. John B. Sailor CLIFF CASTLE 123 SPINNAKER LANE PORTSMOUTH, RHODE ISLAND 02871 <hr/> I certify that I understand my responsibilities under ORC Rules and Regulations Signature							

BOAT			
Name	PARAGON OF	Sail Nr	US-12345
File	PARAORC.dxt	Data in	meters/kilograms

RIG			
Forestay Tension	Fixed	Spreaders	3
Inner Forestay	None Fitted	Runners	0
Carbon Mast	No	Jumpers	Yes
Taper Hollows	No	w/o Backstay	No
P	15.505	E	5.627
IG	14.521	J	4.250
ISP	14.571	SFJ	0.000
SPS	2.456	SPL	4.232
BAS	1.886	TPS	0.066
BAL	0.153	FSP	0.066
MDT1	0.103	MDL1	0.165
TL	2.500	MWT	182.00
MDT2	0.075	MCG	5.750
MDL2	0.089	CPW	2.900
MW	0.189	BD	0.182
GO	0.219	BWT	

HEAVY ITEMS			
Bow Thruster	No	Generator	Yes
Windlass	Yes	Jib Furler	No
Heavy Deck	Yes	Main Furler	No
Headliners	Yes	Water Heater	Yes
Anchor Weight		Heavy Items Adjustment	0.0048
Anchor LCG		Total Gyradius Adjustment	0.0309
Air Condition	No	Desalinator	No

MIZZEN RIG AND SAILS			
N/A			

COMMENTS			
Sample Certificate Not Valid for Racing			

INCLINING TEST AND FREEBOARDS			
Inclining Test Current Inclining			
Flotation date 18.05.1991		SG 1.0230	
FFM	1.228	FF	1.229
FAM	1.009	FA	1.010
SFFP	0.614	SAFP	11.190
W1	17.000	PD1	39.0
W2	34.000	PD2	75.0
W3	51.000	PD3	119.0
W4	68.000	PD4	156.0
WD	12.025	GSA	28.3
RSA	3216.9	PLM	1516.0
Maximum beam station from stem		7.327	
RM Measured / Default		137.1 / 148.4	
Limit of positive stability		121.5°	
Stability Index		122.0	
Freeboard at mast at 4.250		1.122	

PROPELLER			
Installation	Out of Aperture	PRD	0.434
Type	Folding	PBW	0.120
Twin Screw	No	PIPA	0.0036
PSA	18.000	PHL	0.153
PSD	0.028	ST1	0.026
PHD	0.044	ST2	0.105
ST3	0.105	ST4	0.057
ST5	0.183	ESL	0.979

WATER BALLAST			
N/A			

CENTERBOARD			
N/A			



World Leader in Rating Technology

2009
IMS Measurement
Certificate

Certificate

Number 12345
ORC Ref N/A
Issued On 26.12.2008
VPP Ver. beta16
Valid until 31.12.2009

Space for
Rating Office
custom logo

SAILS (Maximum Areas)									
Mainsail	HB	MGT	MGU	MGM	MGL	MSW	Area	Formula	
	0.210	1.25	2.20	3.60	4.70	22.00	52.10	$P/8 \cdot (E + 2 \cdot MGL + 2 \cdot MGM + 1.5 \cdot MGU + MGT + 0.5 \cdot HB)$	
Jib/Genoa	JH	JGT	JGU	JGM	JGL	LPG	48.76	$0.1125 \cdot JL \cdot (1.445 \cdot LPG + 2 \cdot JGL + 2 \cdot JGM + 1.5 \cdot JGU + JGT + 0.5 \cdot JH)$	
Symmetric	SL	SMG	SF				96.36	$SL \cdot (SF + 4 \cdot SMG) / 6$	
Asymmetric	ASL	AMG	ASF				89.28	$ASL \cdot (ASF + 4 \cdot AMG) / 6$	
Code Zero	ASL	AMG	ASF				71.82	$ASL \cdot (ASF + 4 \cdot AMG) / 6$	
	13.55	5.90	8.20						

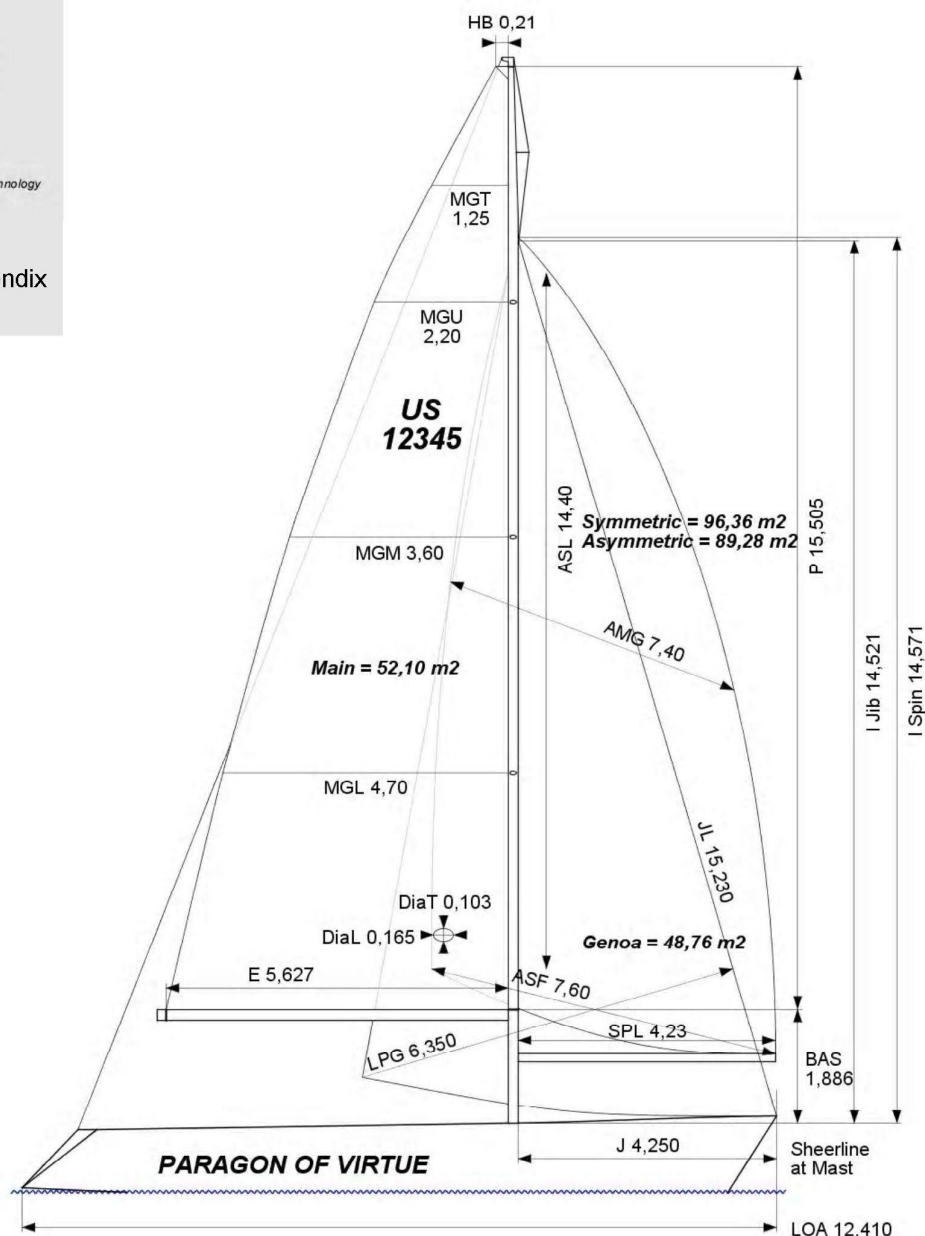
MEASUREMENT INVENTORY			
Measurer Stimson			
Date 18.7.1991			
Comment Fair Weather			
Id	Item	Weight	Distanc Description
1	Anchor	19.0	9.75 Danforth
2	Anchor	7.8	10.00 Fortress
1	Chain	25.0	9.75 8 mm galv. steel
2	Chain	10.0	10.20 6mm ballasted
1	Tools	7.4	8.50 Plastic toolbox
2	Tools	1.9	10.00 Rig cutter
Id	Item	Maker	Model
1	Engine	Yanmar	35 HP
Id	Item	Weight	Description
1	Deck Gear	14.5	Sheets, halyards, blocks
2	Deck Gear	3.4	Winch and Hydraulics Handles

MEASUREMENT INVENTORY						
Id	Item	Tank Use	Tank Type	Capct	Dist.	Condt Description
1	Liquid Tank	Fuel	St.Stl	80.0	8.70	0.0 Service Tank
2	Liquid Tank	Water	Bladder	80.0	9.20	0.0 Port
3	Liquid Tank	Water	Bladder	80.0	9.20	0.0 Starboard
4	Liquid Tank	Water	Day Tank	45.0	10.20	0.0 central
5	Liquid Tank	Sump	St.Stl	38.0	9.80	3.5 Central
Id	Item	Weight	Distanc Description			
1	Ballast	80.0	5.75 3 Lead Pigs Stbd			
2	Ballast	80.0	5.75 4 Lead Pigs Port			
3	Ballast	172.0	6.80 7 Lead Pigs Stbd			
4	Ballast	178.0	6.80 6 Lead Pigs Port			
5	Ballast	28.0	7.10 3 Lead Pigs Centreline			
1	Battery	18.0	8.85 60 Ah Engine			
2	Battery	22.0	7.80 120 Ah Serv ices			
3	Battery	22.0	7.40 120 Ah Serv ices			
4	Battery	28.0	8.50 150 Ah Supplemental			
1	Miscellaneous	55.0	7.90 Boiler			
2	Miscellaneous	12.0	8.40 Ladder			
3	Miscellaneous	38.0	10.90 Emergency Tiller			
4	Miscellaneous	0.8	11.00 2 9l Buckets			



World Leader in Rating Technology

2009
Certificate Appendix
Sail Plan

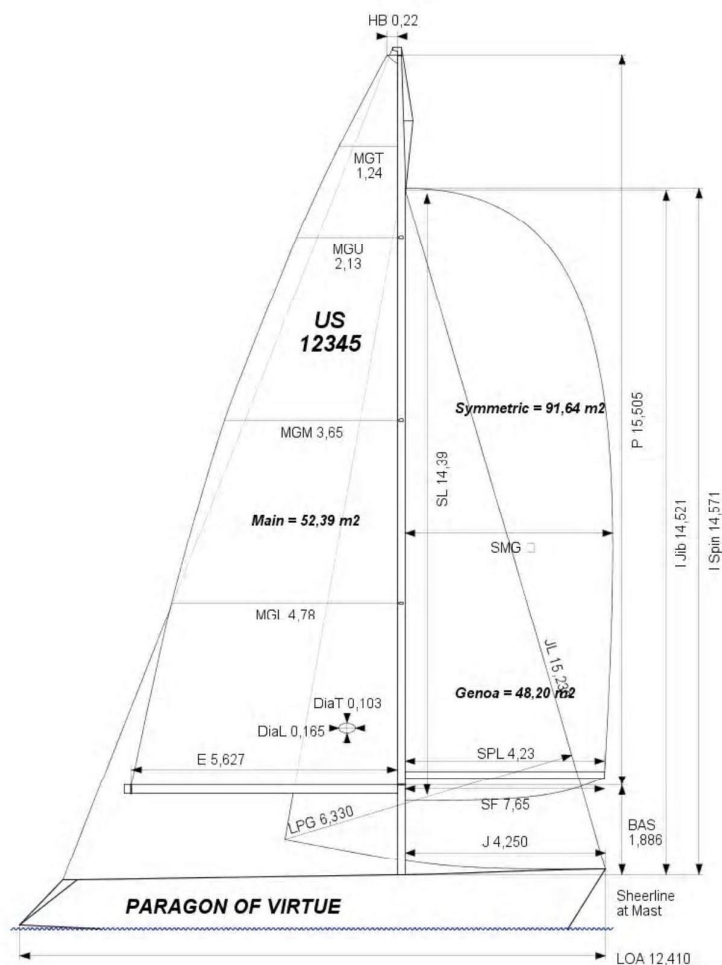


ORC RATING SYSTEMS

SAILS INVENTORY

MANSAIL														
Id	HB	MGT	MGU	MGM	MGL	MSW	Area Measurer			Meas.Date	Manufacture	Material	Comment	
1	0.220	1.24	2.13	3.65	4.78	24.00	52.39	Stimson		15.07.1991	North	Kevlar		
2	0.210	1.25	2.20	3.60	4.70	22.00	52.10	Stimson		15.07.2002	UK	Carbon		
JIBS / GENOAS														
Id	JH	JGT	JGU	JGM	JGL	LPG	JL	Ovrlp	Area	Measurer	Meas.Date	Manufacture	Material	Comment
1	0.00	0.00	0.00	0.00	0.00	6.33	0.00	149%	48.20				Unknown	Heavy Weather Jib #3
2	0.10	0.00	0.00	0.00	0.00	4.00	0.00	94%	30.46				Unknown	
3	0.12	0.00	0.00	0.00	0.00	4.50	0.00	106%	34.27				Unknown	
4	0.07	0.00	0.00	0.00	0.00	6.00	0.00	141%	45.69				Unknown	Heavy #1
5	0.06	0.00	0.00	0.00	0.00	6.35	0.00	149%	48.35				Unknown	Medium #1
6	0.00	0.00	0.00	0.00	0.00	6.38	0.00	150%	48.58				Unknown	old Light #1
7	0.00	0.00	0.00	0.00	0.00	5.85	0.00	138%	44.55				Unknown	old #2
SYMMETRIC SPINNAKERS														
Id	SL	SMG	SF	Area Measurer			Meas.Date	Manufacture	Material	Comment				
1	14.39	7.64	7.60	91.52					Unknown	Runner 0.5				
2	14.45	7.70	7.55	92.36					Unknown	Reacher 0.75				
3	15.50	7.40	7.70	96.36					Unknown	Floater 0.4				
ASYMMETRIC SPINNAKERS														
Id	SLU	SLE	ASL	AMG	ASF	Area	Kind	Measurer	Meas.Date	Manufacture	Material	Comment		
1	14.40	14.40	14.40	7.40	7.60	89.28	asy m				Unknown	A0		
2	16.00	12.00	14.00	6.80	7.70	81.43	asy m				Unknown	A2		
3	16.20	12.20	14.20	7.50	7.40	88.51	asy m				Unknown	A1 old		
4	15.20	11.90	13.55	5.90	8.20	71.82	code0				Unknown	Code Zero		

ORC CLUB CERTIFICATE SAMPLE



World Leader in Rating Technology

2009 ORC Club Certificate

Rating Office

ORC Sample Run
Address 1
Address 2
Address 3

Space for
Rating Office
custom logo

Certificate

Number 12345
Issued On 26.12.2008
ORC Ref N/A
VPP Ver. beta16
Valid until 31.12.2009

Comments

Crew Weight

Declared 815 kg
Default* 689 kg

Double Handed ToD 588.1
Double Handed ToT 1.0203

Sails Limitations

Genoas 4 Spinnakers 4
Jibs 3

Spinnaker configuration
Symmetric Spinnaker Only

Stability

LPS (Measured): 121.5°
Stability Index: 122.0
OSR Category: 0

Owner

MR JOHN B SAILOR
123 SPINNAKER LANE
PORTSMOUTH, RHODE ISLAND
02871

I certify that I understand my
responsibilities under ORC Rules and
Regulations

Signature

BOAT
Name PARAGON OF VIRTUE
Sail Nr US-12345

GPH
583.2

HULL
Data File PARACLU.dxt LOA 12.410 m
Offset File PARAVIRT.OFF MB 3.630 m
Displacement 5,747 kg Draft 2.305 m

CLASS
Class TRIPP 40
Designer TRIPP
Builder
Series 05.1991
Age Date 05.1991
Age Allowance 1.105%

IMS Regulations Division	Cruiser/Racer
Dynamic Allowance	0.000%
Forward Accommodation	No
Hull Construction	Light/Other
Carbon Mast	No
Carbon Rudder	No

HEAVY ITEMS					
Bow Thruster	No	Generator	No	Air Condition	No
Windlass	No	Jib Furler	No	Desalinator	No
Heavy Deck	No	Main Furler	No		
Headliners	No	Water Heater	No		

IMS L 10.466 Wetted Area 26.41 m2 VCGM -0.091
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Anchor Weight	Heavy Items Adjustment	0.0000
Anchor LCG	Total Gy radius Adjustment	0.0040

PROPELLER			
Installation	Out of Aperture	PRD	0.434
Type	Folding	PBW	0.120

SCORING OPTIONS

	OFFSHORE COASTAL / LONG DISTANCE			INSHORE WINDWARD / LEEWARD		
Time On Distance	583.2			647.0		
Time On Time	1.0288			1.0433		
Performance Line	PLT 0.939	PLD 125.6		PLT 1.170	PLD 349.9	
Triple Number	Low 1.0211	Medium 1.2998	High 1.4589	Low 0.7773	Medium 1.0490	High 1.2167

INDEX OF SYMBOLS

AA	Age Allowance	103.1
B	Effective Beam	100.7
BLRI	Ballast Leeward Recovery Index	106.4
BTR	Beam Depth Ratio	100.9
CI	Capsize Increment	106.2
CW	Crew Weight	102
DA	Dynamic Allowance	103.2
DSPM	Displacement in Measurement Trim	100.5
DSPS	Displacement in Sailing Trim	100.5
FA	Freeboard Aft (for default SG)	100.2
FF	Freeboard Forward (for default SG)	100.2
GPH	General Purpose Handicap	402.2
HBI	Height of Base of I	100.4
IM	Foretriangle Height	108.5
IMS L	Sailing Length	100.6
LPS	Limit of Positive Stability	106.1
LSM0-4	Second Moment Lengths	100.6
PIPA	Propeller Installation Projected Area	105.1
RA90	Righting Arm, 90 degrees	106.4
RM	Righting Moment	107
RMC	Righting Moment Corrected	107.3
SI	Size Increment	106.2
T	Effective Hull Depth	100.8
VCGD	Vertical Centre of Gravity from the offset datum line	100.10
VCGM	Vertical Centre of Gravity from the measurement trim waterline	100.11