2026

ORC

The Equal Chance to Win

OFFSHORE RACING CONGRESS

ORC European Chasmpionship 2025 @ Janis Spurdzins

ORC Race Management Guide

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1. INTRODUCTION

The Offshore Racing Congress (ORC) was born in 1969 when a need was identified by the Cruising Club of America and the Royal Ocean Racing Club to have a single rating rule system that could service the needs of offshore racing boats competing on both sides of the Atlantic. This was called the International Offshore Rule (IOR) and was the prevailing system used worldwide for decades, followed by the VPP-based IMS system in the mid-1980's and then since 2007 the current ORC rating system in use today.

Being an International Rating System recognized by World Sailing, there has also been a long association of the rating rule system with Grand Prix-level regattas, where the high levels of competitiveness push the rules and standards to their limits. Defining and developing the formats and standards for annual World and Continental ORC Championship events has been the ongoing work of the ORC's Offshore Classes and Events Committee, where they are published yearly in the ORC 'Green Book' of championship rules.

In more recent years the ORC rating system has grown rapidly to now provide fair racing at all levels of competition, from Grand Prix to club racers, and it issues over 10,000 certificates to boats of all types in more than 40 countries. These include not only monohull offshore-capable cruiser/racers but also Sportboats (light fast keelboats 6.00 – 9.15 m in length), Superyachts (>30 m in length) and Multihulls as well. With this increased popularity and widespread use, often by race organizers and managers new to the system, the need has arisen for a coherent set of guidelines on how they can make the most of this accurate and versatile rating system.

This edition of the ORC Race Management Guidebook is intended to provide this advice for monohull and multihull yachts that have current and valid ORC certificates. We urge experienced race organizers and managers to review this guide and use it as a reference, while those that are new to use of ORC should study it carefully and also keep as a reference.

Racing styles evolve with time, and new ideas and innovations arise as the sport changes. Therefore, we intend to improve this book with regular updates as new features that are generated by the ORC system, and as new ideas come from the racing community itself.

It is important to note that this Guide does not give explanations of national scoring options available in the ORC system – some countries have developed and established use of, for example, as well as custom made specific ToD or ToT rating shown on certificates issued in those and other countries. Guidance on use of these and other "non-standard" options should be sought from the Rating Office in that country.

Regardless, ORC is pledged to help grow, improve and sustain the sport, and our staff is available to offer support for new and existing users of this system. Please contact us for any questions or clarifications on our website: https://orc.org/organization/about/contact.

2. EVENT STRUCTURE

2.1 Basics – overview

The popularity and effectiveness of a rating system will very much depend on how it is implemented by event organizers and race managers. ORC offers many possible solutions for fleets ranging from local club races to World Championships, but to be effective the appropriate choices should be made among these options, starting with the structure of the event.

Consider, for example, the type of race: is it a Windward/Leeward course race, a short-day race around an island, an overnight race, or a long oceanic race? Each will have its own set of appropriate rules and standards.

2.2 Committee structure

a) ***Race Committee*** – Composition of the Race Committee (RC) will vary with the type of racing. Inshore course races require more members to handle setting and moving buoys, compared to distance races where a starting and finishing line is only needed. This is no different than any other type of racing. However, one common element is having accuracy in recording elapsed time data for each boat's finish, and additional information such as course distance data, wind direction and wind speed depending on the scoring type used. Therefore, make sure there are suitable personnel on the RC assigned to take on these important tasks.

b) ***Technical Committee*** - Note that RRS 92 specifies the appointment of a Technical Committee to be a resource to resolve issues related to measurement, inspection, and other issues. Whether or not your event intends to conduct measurements and inspections, it is nonetheless important to have someone available to fill this role who is available and familiar with ORC rules so they can be consulted on these and other ORC-related technical matters both before and during the event.

c) ***Protest Committee*** – Ideally the members of the Protest Committee or Jury should be experienced with keelboat and/or offshore boat fleet racing and have some familiarity with both safety and ORC rules. On matters related to ORC rules, they should be prepared to work with the Technical Committee or refer the matter to ORC (see RRS 63.5(d)).

2.3 Notice of Race

The Notice of Race (NoR) is a basic document for every regatta defined as a "contract" between the organizer and competitors. ORC provides a convenient Standard NoR template, available as a separate section of the **ORC Green Book of Championship Rules** on the ORC Rules **webpage**. Even though it is intended for use in ORC World and Continental championships, the Standard NoR may be edited to be used for any race or regatta where ORC scoring is used. However, there are some specific items that needs to be included for ORC events such as follows:

a) ***Rules*** – applicable rules shall include the **IMS Rule** as a measurement rule and **ORC Rating Systems** as a rating rule. Even though both documents may be considered under the RRS definition of "*rule*" it is always worth mentioning this in the NoR so competitors may know where to look for any technical explanation of the rules. **ORC Sportboat Class Rules** shall be included for any class organized for ORC Sportboats only.

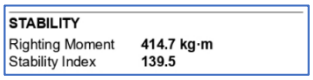
b) ***Safety rules*** – It is important to define safety rules and apply the appropriate category to the type of the race. This may be through the World Sailing **Offshore Special Regulations** (OSR) or US Sailing's **Safety and Equipment Regulations** (SER). OSR Race Categories are defined as:

- Category 0 - Trans-oceanic races
- Category 1 - Races of long distance and well offshore
- Category 2 - Races of extended duration along or not far removed from shorelines
- Category 3 - Races across open water, most of which is relatively protected or close to shorelines.
- Category 4 - Short races, close to shore in relatively warm or protected waters normally held in daylight

Note that the ORC Sportboat Class applies OSR Appendix B for inshore racing close to shore in relatively warm and protected waters.

SER safety rules are commonly used in the US and are defined in these categories: Ocean, Coastal, and Nearshore.

Both OSR and SER set minimum stability requirement for the races of Categories 0, 1, 2 and 3 through Stability Index (OSR SI) or the equivalent ISO standards, which often may be confirmed by the builder.



Stability Index (SI) is shown on the ORC International and ORC Club certificates when stability is measured – it is not shown on an ORC Club certificate when the stability is not measured for that boat.

Please note that it is responsibility of the entry to meet the stability criteria established by the organizing authority.

b) ***Changes to the ORC rules*** – several ORC rules may be amended by the NoR in accordance with RRS 87 as follows:

i) Minimum crew weight - ORC certificates define a Maximum crew weight where the weight of all crew members weighed in light street clothes shall not be greater than the number recorded on the certificate. This shall always apply and therefore shall not be amended by the NoR. There is also a Minimum crew weight that is recorded on the certificate, but this shall be applied only when specified by the NoR and Sailing Instructions. See ORC Rules 102.3 and 200.1(b) for more details.

ii) Allowed amount of liquids on board – Unwarranted quantities of stores shall be considered as ballast because their weight may have a measurable effect on performance. Any liquid carried on board in excess of 2.5 litres of drinkable fluid per person per day of racing, in the tanks or in other containers exclusive of emergence water required by safety rules, and any fuel in excess of the quantity needed to motor for 12 hours, is therefore not permitted. Race organizers of long offshore races may waive this requirement by specifying so in the Notice of Race. See ORC Rule 201.2 for more details.

iii) Moving sails or equipment - Moving sails or equipment with the intention of improving performance (i.e. "stacking") is prohibited and shall be considered as a breach of RRS 51, although organizers of long offshore races may change this in the Notice of Race. See ORC Rule 201.3 for more details.

iv) Auto pilot – Use of automatic and wind-vane devices for steering shall be allowed by the Notice of Race. This may be important particularly for the Double Handed events.

v) Number of sails aboard while racing – A boat shall not carry aboard while *racing* more sails of each type than the numbers defined as follows:

CDL	**Above 13.550**	**13.550 – 11.271**	**11.270 – 9.631**	**Below 9.631**
Mainsail	2	2	2	2
Headsails*	8	7	6	5
Spinnakers	6	5	5	4
Mizzen Staysail	1	1	1	1
Mizzen	1	1	1	1

* *Headsails includes headsails set on the forestay and headsails set flying except when there is a headsail used with a headsail furler recorded in the certificate. In that case only one headsail set on the forestay shall be aboard while racing.*

with the following exceptions:

- One of each: trysail, storm jib, heavy weather jib as defined by the Offshore Special Regulations and of area smaller than the relevant storm sail areas shown on the certificate. These shall not be counted in the numbers above.
- Only one mainsail shall be used while racing.

Since these limits may change yearly but are shown on the certificate, this table is not needed in the Notice of Race or Sailing Instructions unless these limitations are modified according to the appropriate character of the race. For example, the organizer may want to ensure all boats in a class have the same number of sail types allowed on board. See ORC Rule 206 for more details.

c) ***Eligibility and Classes*** – The NoR shall define how entries will be divided in classes and divisions with the criteria explained later in Section 2.5. The options may be, for example, to set up fixed class limits defined by CDL or APH where boats will enter a defined class or to set up a deadline after which the organizer will define classes based on the entries received.

d) ***Registration process*** – Registration should be made available through an online system whenever possible with following items considered:

i) There should be a deadline until when a valid ORC certificate should be issued. ORC certificates are available in digital format and are valid as soon as uploaded to the ORC Database. There is no need for a printed copy and organizers can easily check for the existence of a valid ORC certificate in the **ORC Database**. This deadline may vary but should not be later than up to one week before the start of the event. This will help rating offices with certificate processing and organizers to prepare an entry list and scratch sheet. When defined, this rule will need to specify that it changes RRS 78.2.

ii) No changes shall be made on an ORC certificate after this deadline except with the permission and approval of the Technical Committee or the Race Committee either as a result of a pre-race measurement check or if an error is discovered. It is important to correct any error on the certificate before the start of the first race. Corrections are allowed by ORC Rules and explained further in Section 2.4 about certificate handling.

iii) If crew lists are needed, there should be a deadline for amending these lists. The entry form presented as part of the registration process shall include a list of crew members that will be onboard at the first day of the race. For subsequent changes in the crew there should be a request made on an appropriate form.

iv) If a Corinthian Division is desired, then World Sailing's Sailors Categorization Code shall be applied. More details that relate to the use of this **code** are on the WS website.

e) ***Schedule of races*** – The Schedule of races should give the time for the warning signals for each race and describe the type of race (windward/leeward or coastal/long distance).

f) ***Scoring*** – The Scoring section should explain which scoring method will be used as explained later in Section 3. If the Weather Routing Scoring is used, the deadline for publishing ToD or ToT ratings as calculated by the WRS shall be defined. If custom-made single number scoring option is used, the wind matrix for the course model shall be specified.

2.4 Handling rating certificates

2.4.1 ORC Rating Systems provides the following types of certificates issued only by an established national **Rating office**:

a) ***ORC International*** – for a completely measured boat

b) ***ORC Club*** – where measurement data may be measured, declared by the owner, or obtained from any other source, including photos, drawings, designs, data from identical or similar boats.

c) ***ORC Double Handed certificate*** **–** may be issued from the data needed for ORC International or ORC Club certificate and shall apply for crews made of two persons.

d) ***ORC Non-Spin/HSF certificate*** **–** may be issued from the data needed for an ORC International or ORC Club certificate and shall apply for boats not using any spinnaker nor headsail set flying.

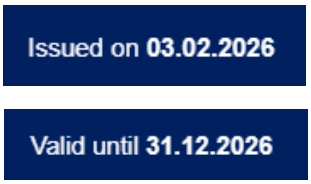
e) ***ORC One Design certificate*** – ORC International or ORC Club certificates where all data affecting a boat's rating are standardized based on the set of measurements for classes having One Design class rules or having all the measurements within close tolerances. A list of these can be found at this **link**.

All certificate types are fully compatible and may be used on same event. However, some of these like Double Handed and Non-Spinnaker may be separated in different classes or divisions as described later in Section 2.5.

2.4.2 From the race management point of view the following items should be considered when handling rating certificates:

a) ***VPP year*** – ORC Rating Systems use science and technology to develop its handicap system through the Velocity Prediction Program (VPP). This VPP is updated yearly and therefore it is imperative to have all boats in the same race with certificates using same VPP year. The VPP year is shown on the upper box of each rating certificate.

b) ***Expiration date*** - The certificate is valid until the date printed on the certificate, which should normally be 31 December of the current year, but different expiration dates may be set by the Rating office. For example, some countries in the southern hemisphere use 30 June to change the VPP version. The expiration date is printed in the Certificate box of each rating certificate.



c) ***Valid certificate*** - A boat may have more than one certificate issued during the same VPP year period, but only the last one issued will be valid. Double Handed and Non-Spinnaker certificates may co-exist at the same time with the regular ORC International or ORC Club certificates. Copies of all latest valid certificates are available for free viewing and download on the ORC website.

Rating data is also available in form of RMS files that may be used by **ORC Scorer** and any other scoring software as explained later in the Scoring section.

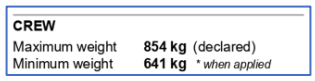
d) ***Compliance with the certificate*** – is defined as:

i) All measured, declared or recorded values shall be as close as possible to those on the certificate. Differences are allowed only if the values on the certificate give a worse (i.e. faster) rating with a lower All-Purpose Handicap (APH).

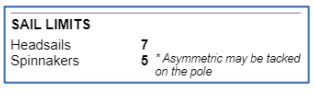
ii) The sail area should be smaller or equal to what is printed on the certificate. The sail inventory shall include the largest of each when applicable: mainsail, mizzen, quadrilateral sail or sail set on the wishbone boom, headsail set on the forestay, symmetric spinnaker, asymmetric spinnaker, mizzen staysail and all headsails set flying and all asymmetric spinnakers having SHW/SFL < 0.85.

e) ***Owner's declared values***

i) Crew weight is an important factor affecting the boat's performance and is considered in the VPP rating calculations. The crew shall not be heavier than the Maximum value recorded on the certificate. The maximum value may be declared by the owner. If not declared, it will be calculated as default according to the size of the boat. And if the NoR or Sailing Instructions specify, then the crew weight shall not be less than the Minimum shown on the certificate.



ii) When there are symmetric and asymmetric spinnakers in the sail inventory together with a spinnaker pole and bowsprit, an owner may declare that the asymmetric spinnaker will be used only when tacked on centreline. Appropriate message explaining how asymmetric spinnaker may be used in relation to the pole is shown at the Sail Limitation section.



f) ***Correcting errors in the certificate*** – ORC Rule 303.6 allows correction of any certificate when the Rating Office has reasonable evidence that not by her own fault a boat does not comply with her certificate. Whenever there is such an error found on the certificate, by any party, the Rating Office shall be contacted immediately explaining the error and the need for correction. Correction may be done at any time before, during or after an event, and all races shall be rescored using the new rating data. This underscores the importance to have all certificates being reviewed prior to the start of the first race.

2.5 Entry organization

One of the most difficult tasks for race organizers is to define racing groups. The definitions can be applied at all levels – local, regional and national, and even international such as at the ORC World and continental Championships. Entries are divided into groups variously called Classes, Divisions, Sections, Fleets, etc., with the goal of having boats of similar characteristics racing against each other whenever possible.

ORC has several ways to help define appropriate racing groups. Application of these criteria should be made after careful consideration of the expected fleet of competitors and can be made singly or in combination of multiple criteria, such as boat types, APH ratings, etc. These groups should be described in the Notice of Race of the event and/or within broader national or regional rules and standards.

ORC World and Continental championship classes are defined by CDL yearly and by ORC as follows:

- Class 0: 16.400 ≥ CDL > 13.550
- Class A: 13.550 ≥ CDL > 11.270
- Class B: 11.270 ≥ CDL > 9.630
- Class C: 9.630 ≥ CDL > 8.000

Class Division Length (CDL) is one of the main parameters that may be used for dividing boats in classes for inshore racing. Since most inshore races have an upwind start, CDL is a parameter defined by the average of the effective sailing length (IMS L) and the rated length (RL) that is calculated from the upwind speed of the boat in a True Wind Speed of 12 knots. CDL is shown in a separate box on the ORC certificate.

All-Purpose Handicap (APH) is an average representation of all time allowances in all wind speeds and wind directions. It is used for simple comparisons between boats and possible class divisions., but also for Class definition at the ORC Double Handed World and Continental Championships as follows:

- Class A: APH from 418.0 – 517.9 s/NM
- Class B: APH from 518.0 – 557.9 s/NM
- Class C: APH from 558.0 – 630.0 s/NM

Special divisions: Fleets may also be divided in separate divisions like Double Handed or Non-Spin/HSF using relevant ORC ***Double Handed*** or ***Non-Spin/HSF*** certificates. Additionally, boats that comply with ***ORC Sportboat Rules*** may be grouped in a separate division. Whenever possible it is better to have these fleets racing separately but if the number of boats cannot justify this, such boats may be added to the other classes as well.

Performance and Cruiser/Racer categories: Additionally, boats may also be categorized as Performance or Cruiser/Racer as defined by IMS Appendix 1 where ***Cruiser/Racers*** are boats designed primarily for cruising and are equipped with accommodation layouts comparable to the standards of series production boats. Those boats not meeting these requirements are categorized in the ***Performance*** division. ORC races may be run with boats from both categories, and organizers may wish to use these categories in fleet organization.

Dynamic Allowance (DA) is a parameter that applies to Cruiser/Racers that describes the boat's behaviour in unsteady conditions and is related to sail area, volume and wetted surface of the boat. Boats of both categories older than 30 years in design will also get a DA.

2.6 Sailing Instructions

Just as for the Notice of Race, ORC provides a convenient Standard Sailing Instructions template, available as a separate section of the ORC Green Book of Championship Rules on the ORC Rules **webpage**. Even though it is designed primarily to be used for ORC World and continental championships, it may be edited to be used for any race or regatta where ORC scoring is used.

In addition to the items already described in the Notice of Race sections, there are some specific items that needs to be included in the Sailing Instructions for ORC events as follows:

a) ***Discretionary penalties*** **–** The Sailing Instructions should define for which breaches of the rule discretionary penalties, with the notation '[DP]', may be imposed by the Protest Committee that may be less than disqualification. These may include items such as the following:

- number of sails on board
- placement of the bow numbers
- minor breaches of the safety rules
- not reporting the use of the engine for rescuing people or giving help
- failing to request the change of crew or equipment
- use of support boats
- communications with the Race Committee
- haul out restriction

A Discretionary Penalty Imposed (DPI) document may be created and published as an appendix to the Sailing Instructions.

b) ***Communication of the Race Committee with competitors*** – It is highly recommended to have frequent and clear communications from the Race Committee to competitors through the VHF as it is described later in the Race Management best practices section. The Sailing Instructions should then include limitations of possible requests for redress based on OCS calls with wording such as:

> *"If any part of a boat's hull is on the course side of the starting line at her starting signal and she is identified, the race committee will attempt to broadcast on VHF her sail number, bow number or the name of the boat. Delay in the radio broadcast of these calls, or the order in which they are made, or any omission or failure in the transmission or reception of these, will not be grounds for a request for redress by a boat. This changes RRS 61.1(a)."*

Another example is this wording:

> *The following communications may be made by the race committee on VHF: time checks and starting times, starting order and designation of race areas, confirmation of any visual signal displayed, courses including bearing and distance to the first mark, change of course, shortening, postponement, abandonment and other information explaining the intentions of the race committee.*
>
> *Delay in the broadcast of these calls, or the order in which they are made, or any omission or failure in the transmission or reception of these, will not be grounds for a request for redress by a boat. This changes RRS 61.1(a).*

c) ***Scoring*** –Selection of the scoring options shall not be grounds for a request for redress by the boat, and the following wording should be included:

> *"The decision on the scoring method and scoring parameters used will be at the sole discretion of the race committee and together with length of course, directions of leg and the wind direction and speed will not be grounds for request for redress by a boat. This changes RRS 61.1(a)."*

d) ***OCS Penalty*** – It is common practice in long offshore races to have a scoring penalty for OCS instead of disqualification. If this is the case World Sailing Development Rule DR 21-01 shall be used as explained at this **link**. However, it may also be noted that with currently available ways of communication (flags, VHF, SMS or mobile messaging) Race Committee may clearly transmit the message of boats identified on the course side at the starting signal, and it should be boat's responsibility to sail back and start correctly.

3. SCORING

3.1 ORC Rating

ORC Rating is not just a single number expressed as time correction factor in Time-On-Time or Time-On-Distance format. An ORC certificate provides a range of ratings (time allowances expressed in secs/NM) for wind conditions in the range of 4 – 24 knots of true wind speed, and at angles varying from an optimum VMG beat to 52, 60, 75, 90, 110, 120, 135, 150 degrees of true wind angle, as well as the optimum VMG run angle.

Rated boat velocities in knots									
Wind Velocity	4 kt	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt	24 kt
Beat Angles	45.3°	42.9°	40.0°	38.0°	36.8°	36.2°	35.9°	36.0°	37.1°
Beat VMG	3.25	4.64	5.61	6.12	6.38	6.54	6.66	6.80	6.82
52°	5.08	7.06	8.18	8.72	9.09	9.36	9.58	9.90	10.08
60°	5.48	7.44	8.45	9.11	9.56	9.88	10.14	10.55	10.82
75°	5.81	7.72	8.66	9.52	10.23	10.71	11.10	11.76	12.24
90°	5.68	7.72	8.79	9.63	10.44	11.32	11.99	13.01	13.80
110°	5.44	7.53	8.72	9.79	10.93	11.90	12.66	14.05	15.92
120°	5.09	7.27	8.65	9.85	11.02	11.98	13.18	15.08	16.74
135°	4.54	6.59	8.15	9.22	10.47	11.93	13.42	15.86	18.84
150°	3.77	5.51	6.98	8.09	9.04	10.16	11.50	14.80	18.76
Run VMG	3.26	4.77	6.04	7.01	7.83	8.79	9.96	12.82	16.25
Gybe Angles	139.5°	141.0°	144.2°	149.3°	149.8°	144.1°	143.8°	143.5°	148.4°

This means that boats will be rated differently when sailing upwind, downwind or reaching under light or strong winds acknowledging that boats performances and relative speeds between them may depend on the weather conditions and the course configuration for that particular race. For example, heavy under-canvassed boats are slow in light airs but fast in strong winds, boats with deep keels go well to windward, and light boats with small keels will go fast downwind.

Boat A - Time allowances in s/NM (APH = 378.8)									
Wind Velocity	4 kt	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt	24 kt
Beat VMG	903.5	669.8	568.8	529.8	507.8	493.7	483.7	473.5	473.7
52°	570.5	441.6	393.0	374.1	360.3	350.0	341.6	330.4	327.2
60°	534.0	419.7	378.5	358.3	344.0	333.4	324.8	312.6	307.1
75°	518.2	407.2	365.2	338.9	323.2	310.7	300.3	284.8	275.0
90°	521.6	407.0	362.6	334.2	309.9	293.6	280.1	259.7	246.6
110°	552.6	425.1	370.6	331.2	300.5	277.7	261.4	236.5	216.8
120°	606.3	452.7	382.5	338.7	306.5	276.4	252.6	223.5	203.6
135°	732.5	509.7	405.4	357.3	316.3	279.7	252.4	218.5	185.7
150°	886.2	610.2	477.1	409.4	366.2	326.7	288.9	229.0	183.7
Run VMG	1023.3	704.6	550.9	472.7	422.9	377.2	333.6	264.4	212.1

Boat B - Time allowances in s/NM (APH = 378.7)									
Wind Velocity	4 kt	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt	24 kt
Beat VMG	943.4	690.9	579.6	537.0	513.6	498.9	488.5	476.4	477.2
52°	590.6	451.0	395.5	375.0	360.8	349.9	341.5	329.1	324.9
60°	533.4	420.8	380.7	358.7	343.5	332.1	323.2	310.1	303.3
75°	493.1	394.7	361.9	338.6	320.9	307.5	296.7	280.4	269.6
90°	496.8	390.3	350.3	325.5	308.6	290.6	276.4	254.9	240.9
110°	527.7	411.8	364.3	325.9	295.2	273.2	257.4	232.9	212.4
120°	586.1	441.8	377.4	335.2	300.4	273.7	250.3	220.9	200.8
135°	740.0	513.0	406.6	357.5	316.3	280.2	251.5	214.1	184.9
150°	895.3	614.7	478.9	409.0	365.3	325.7	288.7	230.8	185.1
Run VMG	1033.8	709.8	553.0	472.3	421.8	376.1	333.4	266.6	213.7

DELTAS (RED - BOAT A IS FASTER, GREEN - BOAT B IS FASTER)									
Wind Velocity	4 kt	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt	24 kt
Beat VMG	-39.9	-21.1	-10.8	-7.2	-5.8	-5.2	-4.8	-2.9	-3.5
52°	-20.1	-9.4	-2.5	-0.9	-0.5	0.1	0.1	1.3	2.3
60°	0.6	-1.1	-2.2	-0.4	0.5	1.3	1.6	2.5	3.8
75°	25.1	12.5	3.3	0.3	2.3	3.2	3.6	4.4	5.4
90°	24.8	16.7	12.3	8.7	1.3	3.0	3.7	4.8	5.7
110°	24.9	13.3	6.3	5.3	5.3	4.5	4.0	3.6	4.4
120°	20.2	10.9	5.1	3.5	6.1	2.7	2.3	2.6	2.8
135°	-7.5	-3.3	-1.2	-0.2	0.0	-0.5	0.9	4.4	0.8
150°	-9.1	-4.5	-1.8	0.4	0.9	1.0	0.2	-1.8	-1.4
Run VMG	-10.5	-5.2	-2.1	0.4	1.1	1.1	0.2	-2.2	-1.6

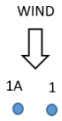
Comparison of Time Allowances of two boats with similar APH showing significant differences in time allowances in different wind speeds and strengths

Therefore, final calculation of corrected times determining results of the race is done with a single number rating taking in account race conditions as one of the options explained in the following paragraphs.

3.2 Polar Curve Scoring (PCS)

When it may be expected that all boats will race in same wind conditions (windward/leeward races or coastal round the cans races with same wind direction for all boats in each leg), course construction may be entered as input to calculate single number Time-On-Distance needed for each boat to sail that course. The course may be constructed with the following parameters:

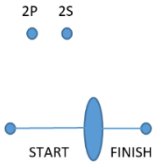
- distance (NM)
- course bearing (magnetic degrees)
- wind direction (magnetic degrees)



** Current velocity and direction can also be entered for each leg if it is known.*

An example is shown below:

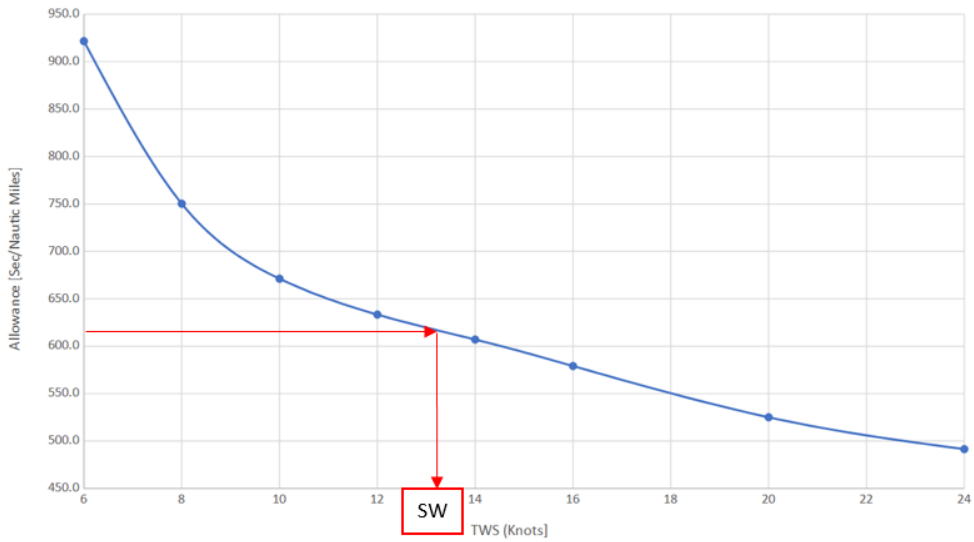
Leg	***Distance***	***Bearing***	***Wind direction***
Start – 1	2.09	162	160
1 – 1A	0.06	060	155
1A – Gate (2P-2S)	1.91	340	155
Gate (2P-2S) – 1	1.89	161	160
1 – 1A	0.06	060	160
1A – Gate (2P-2S)	1.91	340	160
2S – Finish	0.19	316	160



With course defined a table of predicted speeds and time allowances expressed in s/NM for different wind speeds can be calculated for each boat for that particular course.

Boat	***6 kt***	***8 kt***	***10 kt***	***12 kt***	***14 kt***	***16 kt***	***20 kt***	***24 kt***
TP 52	688.9	560.4	499.8	463.9	434.7	408.3	368.8	342.7
Botin 52	701.3	566.6	503.0	466.0	436.5	410.3	371.0	345.1
Botin 52	705.3	568.9	504.5	467.2	437.3	410.5	371.1	345.5
TP 52	708.9	571.4	505.9	467.7	437.4	410.6	370.8	345.4
PAC 52	716.3	577.7	510.9	472.5	441.7	415.1	377.0	353.2
Marten 49	777.8	629.8	555.7	517.0	494.9	475.9	436.5	405.2

With course construction wind direction is defined and another input needed is wind strength. Wind strength is calculated from so-called “Scoring wind” coming also from the performance curve of each boat.



The vertical axis represents the average speed of the boat around the race course, expressed in s/NM. The horizontal axis represents the wind speed in knots. When the finishing time of a boat is known, its elapsed time is divided by the distance of the course to determine the average speed in s/NM.

For example, if the elapsed time of the boat with the curve shown above is 1 hour 28 minutes 11 seconds and the total length of the course is 8.11 NM, the average s/NM for the boat on that course is:

Elapsed time: 1:28:11 hours = 5291 s

Course length = 8.11 NM

$$Allowance = \frac{Elapsed\ time}{Course\ length} = \frac{5291}{8.11} = 652.4\ s/NM$$

This value is then found on the vertical axis, and the software finds the point where it intersects the performance curve to get corresponding point on the horizontal axis. This value is the so-called Scoring Wind. This means the yacht has completed the course "as if" it has encountered that wind speed. The faster the boat has sailed, the higher the Scoring Wind, which is the primary index used for Polar Curve Scoring: the yacht with the highest Scoring Wind wins the race.

The highest Scoring Wind is then used to get time allowance in s/NM for each boat getting by that single Time-On-Distance coefficient to score that race capturing wind direction and wind strength for that particular race.

Scoring Wind is intended as an interpolation between time allowances, not an extrapolation. This means that when the Scoring Wind drops below 4 knots or raises above 24 knots, the time allowances used for calculating the corrected times will be those of 4 knots and 24 knots respectively. This does not mean that ORC races need to be stopped (or not started) with wind below 4 knots or above 24. When the Scoring Wind results calculate to be less than 4 knots or more than 24, the corrected time values at these wind speeds are then used.

While one of the main advantages of the Polar Curve Scoring is that race is scored according to the recorded wind conditions, an objection can be made that final ToD used to score the race is not known before the start of the race. However, when intended course configuration is known (for example: windward/leeward) a scratch sheet can be created assuming 50% upwind and 50% downwind racing.

	Type	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt	24 kt
○	MILLENIUM 40'	818.6	669.6	595.5	559.1	537.5	517.9	477.5	436.5
○	XP 44	843.2	684.3	605.2	565.6	545.0	528.7	501.3	474.3
○	XP-38	918.5	743.7	653.2	609.7	587.2	564.4	536.4	520.6
○	X 41	902.8	729.7	635.9	586.1	556.8	536.0	508.9	491.9
○	X-40	951.5	766.3	668.5	616.4	584.6	562.6	537.6	524.4
○	SWAN 42	828.4	674.0	597.0	559.0	538.8	522.5	489.7	453.3
○	SOLARIS 36 OD	862.0	701.9	627.3	591.1	567.3	545.0	503.5	469.2
○	Salona 41	913.4	737.2	644.0	593.4	562.3	540.0	512.0	494.7
○	ARYA 415	846.0	681.8	601.2	562.1	541.0	523.2	487.4	452.2
○	M45	866.6	697.2	611.9	568.9	540.0	519.1	490.8	471.7
○	IMX 45	851.7	696.4	618.7	574.5	546.3	525.6	500.3	486.8
○	GRAND SOLEIL 43 R	913.4	730.6	634.2	586.1	553.2	530.0	500.6	483.1
○	Grand Soleil 42R	886.7	713.7	626.6	580.2	550.7	529.3	501.1	484.7
○	Grand Soleil 40	947.6	764.3	666.7	614.1	582.6	560.5	534.8	519.5
○	GRAND SOLEIL 39	947.3	763.3	670.0	620.2	589.5	568.4	544.9	537.5
○	First 40	935.9	753.5	652.6	596.2	564.3	542.0	514.7	496.6
○	Farr 40	774.3	652.5	590.9	554.0	530.3	507.5	465.4	435.2

Time allowances in secs/NM for 8 wind speeds

This scratch sheet is interactive allowing the user to select the boat and get differences in s/NM relative to any boat selected. With this information a crew may know what rating differences in s/NM are depending on wind strength and can adjust race tactics based on wind strength during the race.

	Type	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt	24 kt
○	MILLENIUM 40'	-68.1	-44.2	-31.1	-21.1	-13.2	-11.4	-23.6	-48.2
○	XP 44	-43.5	-29.4	-21.4	-14.5	-5.7	-0.5	0.2	-10.4
○	XP-38	31.9	30.0	26.5	29.5	36.5	35.1	35.3	35.9
○	X 41	16.1	16.0	9.3	6.0	6.1	6.7	7.9	7.2
○	X-40	64.9	52.5	41.9	36.2	33.9	33.4	36.5	39.7
○	SWAN 42	-58.3	-39.7	-29.6	-21.1	-11.8	-6.8	-11.4	-31.4
○	SOLARIS 36 OD	-24.7	-11.9	0.7	10.9	16.6	15.8	2.4	-15.5
○	Salona 41	26.7	23.4	17.4	13.2	11.6	10.7	10.9	10.0
○	ARYA 415	-40.7	-32.0	-25.4	-18.1	-9.7	-6.0	-13.7	-32.5
○	M45	-20.0	-16.5	-14.7	-11.2	-10.7	-10.1	-10.3	-13.0
○	IMX 45	-34.9	-17.4	-8.0	-5.7	-4.4	-3.6	-0.8	2.1
○	GRAND SOLEIL 43 R	26.7	16.9	7.5	5.9	2.5	0.7	-0.5	-1.6
◉	Grand Soleil 42R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
○	Grand Soleil 40	61.0	50.6	40.0	33.9	31.9	31.2	33.7	34.8
○	GRAND SOLEIL 39	60.7	49.6	43.4	40.0	38.8	39.1	43.8	52.8
○	First 40	49.3	39.8	26.0	16.1	13.7	12.7	13.6	11.9
○	Farr 40	-112.4	-61.3	-35.7	-26.2	-20.4	-21.7	-35.7	-49.5

Scratch sheet for one boat selected as a "scratch boat" showing differences in time allowances relative to all other boats in the fleet

Polar Curve scoring is also available for two pre-selected courses trying to simplify course construction

- **Windward/Leeward** – with 50% upwind and 50% downwind race legs
- **All Purpose** – includes equal distribution of all wind directions.

Selected Courses									
Windward / Leeward	987.2	700.3	566.3	504.7	467.7	437.5	410.9	371.5	345.4
All purpose	716.0	526.8	441.3	398.9	370.5	347.4	328.1	300.0	281.4

However, whenever is possible to get course constructed leg by leg results will be more accurate.

3.3 Weather Routing Scoring (WRS)

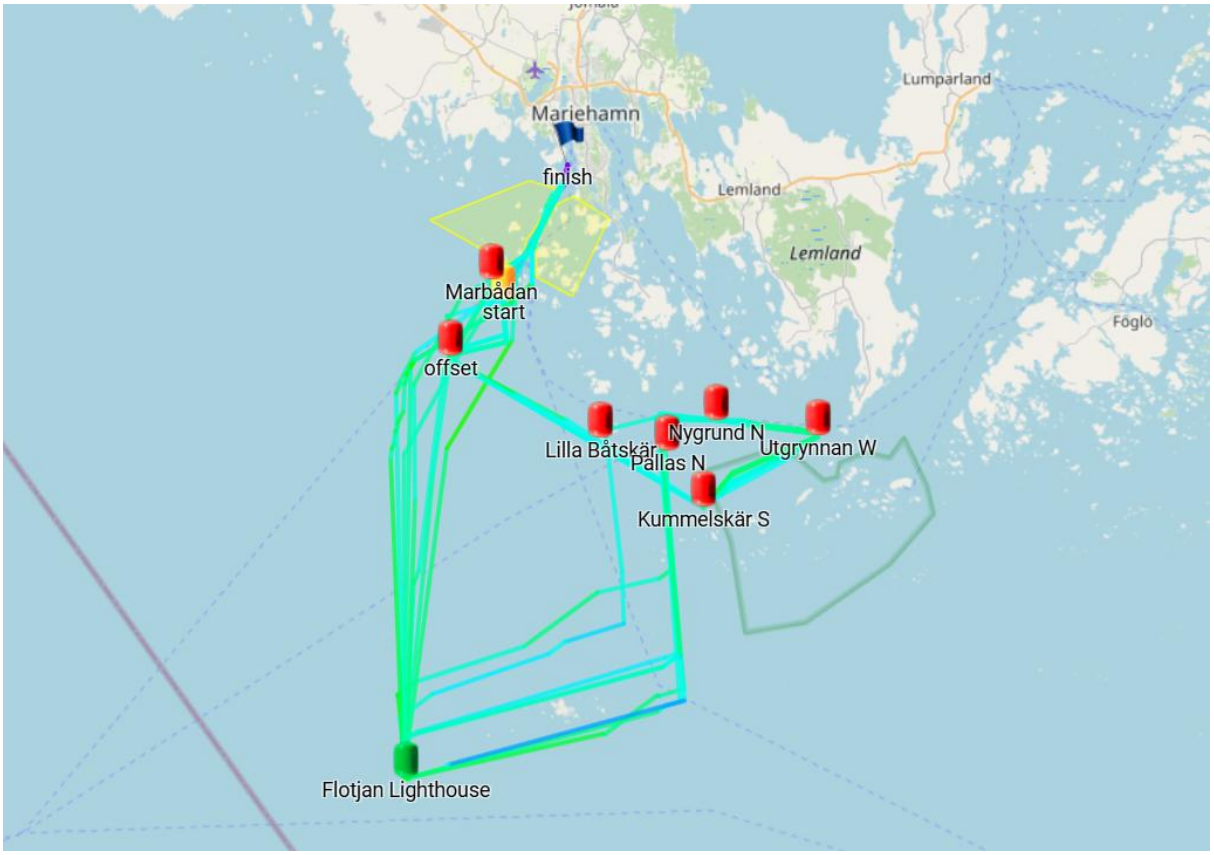
It may be expected that on the offshore races and longer coastal races, boats will race in different wind conditions since faster boats may have different winds from slower boats on any leg of the course. The PCS approach would therefore not work correctly since it would require different inputs of wind data for each boat.

However, it is possible to calculate estimated time for each boat to complete the course based on the weather forecast prior to the start of the race. With currently available weather forecast technology, ORC has developed in cooperation with PredictWind a method that calculates single number ToD or ToT rating for each boat based on the weather conditions expected before the start of the race.

With polar diagram data available in each ORC certificate and course defined, the PredictWind routing software will calculate the fastest route and predicted elapsed time (PET) for each boat to sail the course. From the PETs calculated for each boat a single number ToD or ToT may be calculated showing the relevant handicaps among the fleet. This approach has two main advantages:

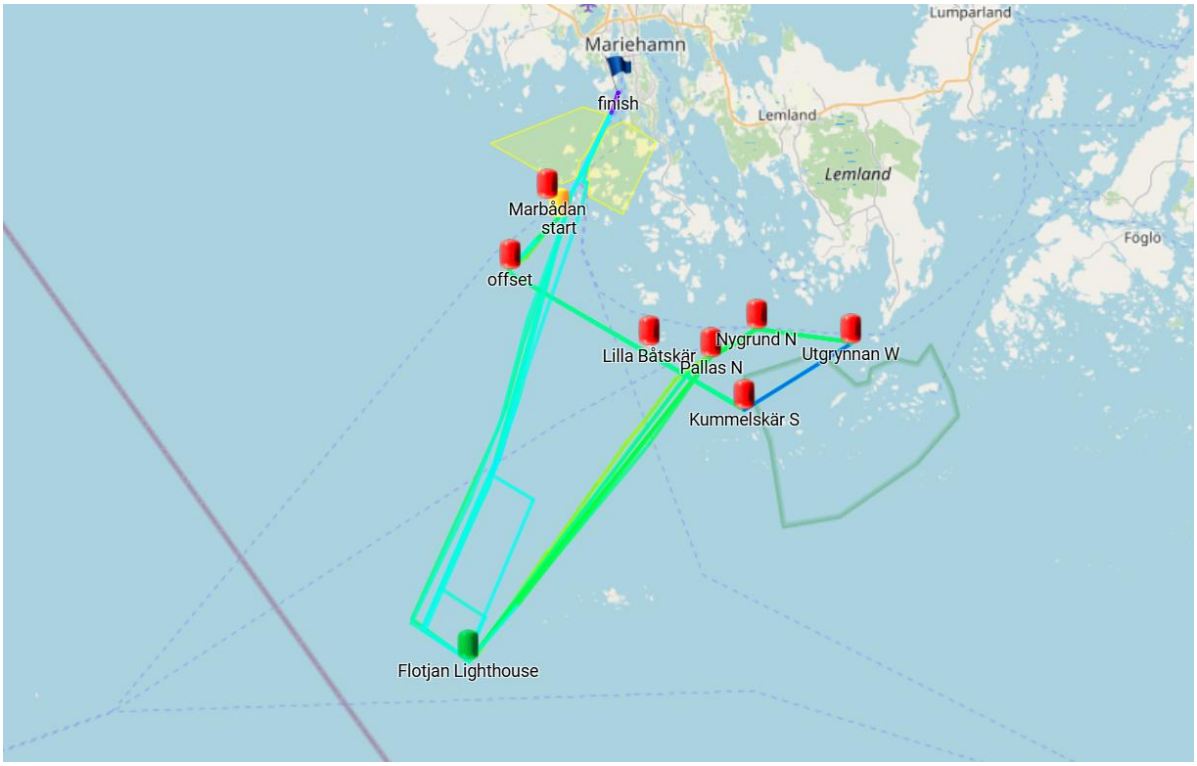
The first is that the scoring of the race is more accurate because it adapts to the race conditions. For example, an offshore race from point A to point B may be raced one year upwind in heavy winds and on the same course the next year it may be sailed mostly downwind or reaching with light winds. Obviously, applying the same ratings for both cases will not be accurate nor fair. WRS will give different ratings for the different wind conditions expected in that race.

Furthermore since each boat's rating is calculated based on her own routing, this will eliminate the advantage some boats may have when the wind may drop or increase close to the end of the race. With APH or any other pre-defined single number approach some boats will get an undeserved advantage when - for example - faster boats complete the course and then the wind drops making it impossible for slower boats to catch up to them on corrected times. With WRS this is taken into account since the predicted finishing times are calculated for each boat separately and will take in account that they are sailing in different conditions.



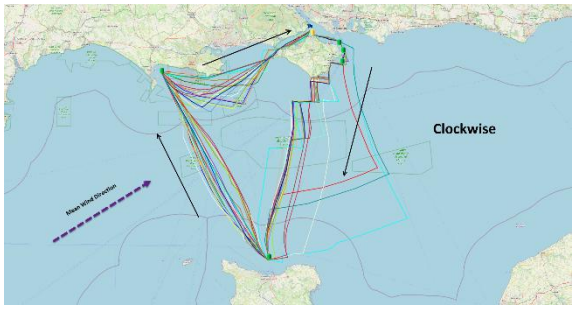
Boat Type	ToD	ToT
TP 52	393.4	1.5252
HH 42	455.1	1.3185
GP 42	456.7	1.3137
Knierim 49	466.9	1.2851
Swan 45	492.0	1.2195
Landmark 43	492.8	1.2174
MAT 1220	493.6	1.2154
Landmark 43	494.6	1.2131

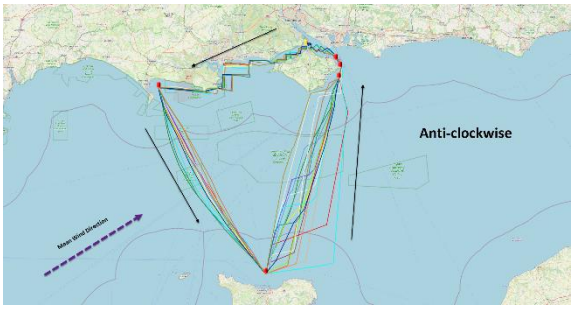
An example of weather routing the fleet on the offshore race with ToD and ToT ratings calculated. Different track colours show different speeds predicted.



Boat Type	ToD	ToT
TP 52	335.6	1.2136
GP 42	395.8	1.0289
HH 42	396.7	1.0267
Knierim 49	403.5	1.0093
MAT 1220	429.7	0.9477
Swan 45	431.8	0.9430
Landmark 43	432.2	0.9422
Landmark 43	432.8	0.9410

The routing of the same race with the same fleet starting on different date.
Different wind conditions are giving different routing and different ToDs and ToTs for the same race.





An example of the same course sailed in the opposite direction. Applying single number ratings will be the same rating for both races, but Weather Routing Scoring gives different ratings as wind conditions are different in each direction of the course sailed.

Boat Type	ToT
Sun Fast 36	0.7827
Italia 9.98	0.7980
JPK 10.10	0.8095
First 40.7	0.8198
Sun Fast 3300	0.8274
Sydney 38	0.8633
J 120	0.8759
Swan 42	0.9298
Swan 45	0.9391
Farr 40	0.9759
Class 40	1.1704
Pogo 44	1.1775
TP 52	1.4689
Maxi 72	1.6464

Boat Type	ToT
Sun Fast 36	0.7333
Italia 9.98	0.7916
JPK 10.10	0.8207
First 40.7	0.8277
Sun Fast 3300	0.8899
Sydney 38	0.9268
J 120	0.9318
Swan 42	0.9731
Swan 45	0.9772
Farr 40	1.0206
Pogo 44	1.0719
CLASS 40	1.1094
Maxi 72	1.3437
TP 52	1.3440

Delta (%)
-0.07
-0.81
1.36
0.95
7.02
6.85
6.00
4.45
3.90
4.38
-9.19
-6.14
-9.32
-22.50

Use of Weather Routing Scoring is currently available through the **ORC Weather Routing Scoring Request Form**. Race Organizers submit their entry list, Notice of Race and Sailing Instructions describing the course with starting and finishing lines, rounding marks and possible exclusion zones together with the starting times for each class. A list of ratings will be provided by the time specified in the Notice of Race with intention for the ORC WRS team to use latest weather forecast available prior to the start of the race.

While WRS ratings are based on the polar performance data of each entry, the PET's calculated by the PW routing software also takes into account any tidal or current effects found on the race course.

A web-based app 'RaceFlow' is under development and expected to be available for the 2025 season. The intent is for this to be made broadly available to all users with guidance for its use to be described in its manual that will be added to this Race Management Guide.

3.4 Custom-made Single Number scoring

A simplified approach to the customizing single number ToD or ToT to the expected conditions on the course is to use one or more wind matrices based on historical wind data. Below is an example of the Cove Island course model option used in the Bayview-Mackinac Race:

BYC Mac Cove Island	2025						Average	7.7
Wind speed (kts)	4	6	8	10	12	14	16	TWA
VMG upwind	7.6%	6.3%	4.6%	4.0%	3.1%	2.4%	2.4%	30.4%
60° reach	4.7%	4.1%	2.4%	1.4%	1.0%	0.8%	0.7%	15.1%
90° reach	4.0%	2.8%	1.7%	1.0%	0.7%	0.5%	0.4%	11.1%
135° reach	4.9%	4.3%	2.8%	2.0%	1.5%	1.1%	0.7%	17.3%
VMG run	7.8%	5.9%	4.7%	3.1%	2.1%	1.3%	1.2%	26.1%
TWS	29.0%	23.4%	16.2%	11.5%	8.4%	6.1%	5.4%	100.0%

It must be noted that this approach will be as accurate so long as the wind conditions on the race are close to those predicted in the specific course model.

Different custom scoring models may be defined by the National Rating Offices and published on their certificates in the section shown on Page 2 of ORC certificates for the National Scoring options.

A custom-made Single number rating can be calculated as Time on Distance. If needed it may also be converted to a Time-on-Time coefficient using the conversion factor of ToT = 600/ToT, but this conversion factor may be different from 600 and set as a ToD figure that represents the middle of the fleet. Use of a different correction factor will not change the places in corrected times; it will only affect the differences in corrected time.

3.5 Simple and easy single number scoring

When there is a need for simple and easy single number scoring option an ORC certificate is offering two options as Time on Distance (ToD) and Time on Time (ToT) ratings for Windward/Leeward and All-purpose course types.

Single Number Scoring Options		
Course	Time On Distance	Time On Time
Windward / Leeward	607.3	0.9880
All purpose	490.5	1.2231

ToD and ToT coefficients are calculated for the respective course models:

- **Windward/Leeward** – with 50% upwind and 50% downwind race legs
- **All Purpose** – includes equal distribution of all wind directions.

with the following wind strength distribution:

TWS (kt)	***6***	***8***	***10***	***12***	***14***	***16***	***20***
Time Allowance percentage	5%	10%	20%	30%	20%	10%	5%

ToT coefficients are calculated for the respective course model (Windward/Leeward or All-purpose) as ToT = 600 / ToD

Corrected times are calculated accordingly:

a) ***Time on Distance*** – With Time on Distance scoring, the coefficient of time allowance of one boat will not change with wind velocity but will change with the length of the course. One boat will always give to another the same handicap in seconds/nautical mile (s/NM), and if the distance sailed is known then it is easy to calculate the difference in elapsed time between two boats needed to determine a winner in corrected time. Corrected time is calculated as follows:

$$Corrected\ time = Elapsed\ time - (ToD_{Delta} * Distance)$$

Where $ToD_{Delta} = ToD_{the\ boat} - ToD_{the\ lowest\ (fastest\ boat)\ in\ the\ fleet}$ and therefore, the corrected time of the boat having the fastest ToD in the fleet will be equal to her elapsed time (this is often termed the "Scratch boat").

b) ***Time on Time*** – With Time on Time scoring, the time allowance will increase progressively through the duration of the race. 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 on the duration of the races. The longer the race is in time, the larger the handicap. Corrected time is calculated as follows:

$$Corrected\ time = ToT * Elapsed\ time$$

Pursuit racing – For casual races, race managers may consider use of the Pursuit start, where for a known and measured distance of the course and the selected ToD ratings of the entries, a unique start time is calculated. In this format the boat starts the race at their designated time, with the slowest-rated entries starting first followed by others in progressive order of rating. Results are then determined by the order of boats crossing the finishing line. To calculate the start times on the scratch sheet, this formulation is used:

$$Starting\ time = Starting\ time\ of\ the\ slowest\ boat + (ToD_{slowest\ boat} - ToD) * course\ length$$

3.6 Scoring software

The **ORC Scorer** is free Windows software covering all options of ORC scoring. Boat rating data are imported online or via rating files. ORC Scorer can be downloaded from the ORC Sailor Services, where also a quick **startup guide** is available.

Other scoring software products are available on the market and may be used when it complies with the scoring options explained above.

4. RACE MANAGEMENT BEST PRACTICES

4.1 Race Management Best Practices

Running an ORC event is not significantly different from running any other sailing race. However, there are some aspects that needs to be addressed specifically while using the ORC system. For this ORC offers tools that can make race management tasks even easier. This guidebook is not intended to give an overview of the basics of proper race management; there are many other resources available and this knowledge is assumed.

4.2 Setting the course

a) ***Course distance*** **–** Regardless the scoring method used (as explained in Section 3) setting up the course includes gathering basic information of the position of the marks, length and compass bearings of each leg as well as wind over the course. The polar diagram data available on ORC Certificates make it is easy to calculate the distance of the course needed to achieve the target elapsed time for the race. ORC International and ORC Club certificates with an optional second page show time allowances for pre-selected course types as follows:

Time Allowances in secs/NM									
Wind Velocity	4 kt	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt	24 kt
Beat VMG	943.4	690.9	579.6	537.0	513.6	498.9	488.5	476.4	477.2
52°	590.6	451.0	395.5	375.0	360.8	349.9	341.5	329.1	324.9
60°	533.4	420.8	380.7	358.7	343.5	332.1	323.2	310.1	303.3
75°	493.1	394.7	361.9	338.6	320.9	307.5	296.7	280.4	269.6
90°	496.8	390.3	350.3	325.5	308.6	290.6	276.4	254.9	240.9
110°	527.7	411.8	364.3	325.9	295.2	273.2	257.4	232.9	212.4
120°	586.1	441.8	377.4	335.2	300.4	273.7	250.3	220.9	200.8
135°	740.0	513.0	406.6	357.5	316.3	280.2	251.5	214.1	184.9
150°	895.3	614.7	478.9	409.0	365.3	325.7	288.7	230.8	185.1
Run VMG	1033.8	709.8	553.0	472.3	421.8	376.1	333.4	266.6	213.7
Selected Courses									
Windward / Leeward	987.2	700.3	566.3	504.7	467.7	437.5	410.9	371.5	345.4
All purpose	716.0	526.8	441.3	398.9	370.5	347.4	328.1	300.0	281.4

Time allowances are shown in sec/NM that allows easy calculation of length of the course needed to achieve target time for finishing. For example, if there is a windward/leeward race planned with a target time of 01:15:00 hours, the length of course is calculated as:

Target time = 01:15:00 = 4500 sec
Observed wind speed: 10 kts, Time allowance at TWS of 10 kts = 504.7 s /NM
Length of the course: Target time / Time allowance = 4500 / 540.7 = 8.32 NM

Using the same calculation method for wind of 12 kts and same target time length of the course would yield a result of 9.62 NM. Using this approach, it is easy to build a table of length of the course as a function of wind strength as shown in the example below for a Target time of 01:15:00.

Wind speed (kts)	***4***	***6***	***8***	***10***	***12***	***14***	***16***	***20***	***24***
Time Allowance (s/NM)	987.2	700.3	566.3	504.7	467.7	437.5	410.9	371.5	345.5
Length of the course (NM)	4.56	6.43	7.95	8.92	9.62	10.29	10.95	12.11	13.02
*Length of the 1st leg (NM)**	1.19	1.66	2.04	2.28	2.46	2.62	2.79	3.08	3.31

* *Assuming 2 laps course with 2 windward and 2 leeward legs and the leeward gate at about 0.1 NM windward for the starting line*

Once the total course length is calculated it is easy to divide it by the number of leg/laps and give this information to the mark set boat on where to set up a windward mark.

Obviously, the figures used for this calculation may be from the fastest, mid-fleet or slowest boat in the fleet depending how the target time is set.

b) ***Course data*** – Once the course is set it is always good to have clear communications between the RC signal boat and mark set boats in monitoring the wind speed and direction. This assists the RC to decide if there is needed a possible change or shortening of the course. Data on the length of the course, wind direction and wind strength also need to be collected for scoring purposes. The length of the course may be calculated from the Lat-Lon positions of starting, rounding, and finishing marks along the course or directly from the GPS instrument on the distance to the mark set boat. Regardless, the length of the course shall be recorded to a precision of 0.01 NM.

c) ***PCS course construction*** – When PCS is used the wind direction of each leg should be recorded. The wind direction data should be monitored at the RC signal boat by gathering information from the mark set boats and other RC boats on the course. All course data should be recorded on a log such as this:

Wind Graph **Event** _____

Race area _____ Class _____
Recorders Name _____Position _____Date _____

Current		
Time	Speed	Direction

Time	Wind Speed (Knots)			
	5	10	15	20

Wind Direction						
__	__	__	__	__	__	__

On this form the predominant wind direction of each leg is recorded, and it should be assumed that on the same leg all boats are racing within the same wind direction. In case of a significant change of wind direction, a change of course should be signalled with the new mark set and the new leg distance and angle defined in the course data.

However, if the wind is changed so much that boats no longer have the same conditions on each leg of the course, it is better to abandon the race and set a new course that aligns to the new wind direction.

Also, if there is a significant change in wind direction on the same leg of the course, such a leg may be split and defined as two or more legs.

4.3 Communication from the Race Committee

Race Committee communications through VHF should be clear and frequent, explaining their intentions but also giving information about the race course. This information can include, for example, the length and compass bearing of the first leg of the course and the intended time for the warning signal. Each visual signal should be announced on the VHF with a countdown broadcast in advance and into the last few seconds prior to its display.

It is always desirable to announce boats that are OCS by VHF. Such announcements shall be clear, concise, and uniform using either bow number, sail number or boat names for all boats that are called over the line at the start. Any changes of the course or shortening of the course should also be announced on the VHF.

Radio communication from the Race Committee shall not be ground for redress as described in Section 2.6 with appropriate wording to be included in the Sailing Instructions.

4.4 Race Time Limits

Setting up a time limit in handicap racing needs to take in account rating differences between the fastest and slowest boat in the fleet. As explained in Section 4.2, having a complete set of predicted boat speeds for different wind conditions make this process much easier. There are several ways to define a time limit in the Sailing Instructions:

a) ***Fixed time limit for all boats in the fleet*** – if this option is selected it should be calculated based on the slowest rated boat in the fleet. Whatever method being used to score the race, the appropriate Time on Distance time allowance should be used. For example, if a Time on Time scoring method is used, then the relevant Time on Distance conversion factor should be used as described in Section 3. If time allowances are given for more than just one wind condition, the one for the lightest wind should be used. Once an appropriate ToD time allowance in sec/NM is selected, the estimated time need to sail the course may be calculated as:

Estimated time to sail the course = ToD x Length of course

The final time limit can then be determined by adding some margin based not only on the weather but competitive quality of the fleet: in general, smaller margins may be used for experienced competitors. For others the margin may be up to a 50% increase to the estimated elapsed time.

b) ***Fixed time limit for the first boat with finishing window for the rest of the fleet –*** Time limits for the first boat to finish may be calculated as described in a) above while the finishing window for the rest of the fleet may be calculated from the difference in ratings between the fastest and the slowest-rated boats in the fleet using the same method for selecting appropriate ToD factors:

$$Estimated\ time\ difference\ to\ sails\ the\ course = (ToD_{slowest\ boat} - ToD_{fastest\ boat}) \times Length\ of\ course$$

The final finishing window time limit shall then be determined by adding some margins increase to the estimated time difference to sail the course up to a 50% increase of estimated time difference between the fastest and the slowest boat

c) ***Individual time limit for each boat*** – may be calculated from an appropriate ToD rating and length of the course, such as:

Time limit = ToD x 2.0 x Length of course

where a factor of 2.0 may be adjusted to the type of race. This option is better to be used for Coastal/long distance races where the list of time limits may be printed and given to competitors prior to the start of the race. This option is available in the ORC Scorer Software. Please note that this option requires more attention from the Race Committee when recording finishing times to check that each boat has individually finished within her time limit.

4.5 Recording finishes and publishing results

Finishing times should be recorded to the nearest second in the format of HH:MM:SS of the actual local time when boat crosses the finishing line. With the starting time entered in the same format, scoring software will then do the calculations needed to determine elapsed and then corrected times.

For offshore races lasting longer than 24 hours the finishing day may also need to be recorded. If the race is going through more time zones, be sure to have all starting and finishing times recorded within same time zone, whether UTC or the starting venue time standard.

Results using ORC scoring are often very close. It is perfectly OK if two or more boats are finishing so close to be recorded as having finished within the same second in elapsed time, because their corrected times will likely calculate to be different. If their corrected times are the same, then ties are resolved according to RRS rule A7 with the points for the place for which boats have tied and for the place(s) immediately below added together and divided equally. Therefore, it is important to give the maximum possible accuracy on recording finishing times.

The best practice is to have one RC member monitoring the line identifying the boat finishing and then give the sound signal when they cross the finishing line. Another RC member is then recording the time

of the sound signal by writing on a finishing log sheet. Finishing times should also be recorded by a sound recorder.

The results should be published as soon as possible so that competitors may get results quickly. To facilitate this the scorer should be present on the race committee boat or at the race office with finishing times and course information sent from the race area, such as in photos taken of the log sheets. In either case, the race committee should double check all input data and resulting output with special attention paid to:

- Are all finishing times entered correctly?
- If the race lasts for more than a day, are all finishing days entered correctly?
- Is the starting time entered correctly and elapsed times calculated correctly?
- Are all time limits considered correctly?
- Are all OCS, UFD or BFD penalties entered properly?
- If PCS is used, is the scoring wind of the winning boat within range of the observed wind during the race? If not, double check the course configuration.

Once the RC is satisfied with the results, they may be published on the event web page and announced to the competitors by VHF if appropriate. The **ORC Scorer software** has an option to publish results with single click as described in its user guide.

After the results have been published, they should not be changed unless there is an error discovered. RRS 90.3(c) requires the Race Committee to correct any error that may be found from its own records or observations. If there is any request for correction of results from the competitors, the Race Committee should first check its own record and if the error is found it may proceed in accordance with RRS 90.3(c). If not, the boat may request redress according to RRS 61.1(b).

4.6 Measurement protests

Occasionally an issue may arise where there is an irregularity of a boat with its ORC certificate prior to the start or during racing. This may be, for example, a boat having a sail which is larger than that shown on her certificate, or a question about displacement, or having crew that exceeds the limit shown on the certificate. A Technical Committee appointed by the organizers should handle these matters related to measurement and certificate compliance.

The ORC Rating Systems rules have a clear definition of the procedures for measurement protests defined in ORC rule 305.

The first step for the Technical Committee should be to determine what is not in compliance on the boat with its certificate. If it is determined that this is not the fault of the owner or the crew, then the issue should be immediately reported to the relevant rating office that issued the certificate. They shall withdraw this certificate, correct the error, and issue a new certificate. Note that this may be done before the start or even during the race, if necessary, and should not hinder the boat from racing. In either case once the corrected certificate data is available then results should be re-calculated and updated.

However, if the owner or the crew are responsible for the non-compliance, the procedure should be as follows:

a) ***Prior to the start of first race*** – if the non-compliance is considered to be minor and can be easily corrected, the boat should be brought into compliance with her certificate, and, when necessary, a new certificate should be issued. The Technical Committee shall approve the issue of a new certificate.

   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 Technical Committee shall inform the Rating Authority that the boat is not in compliance with its certificate.

b) ***During races as a result of measurement protest or post-race measurement check*** – A test certificate should be generated with the new measurements taken by the Technical Committee. The resulting APH on the test certificate shall then be compared with the APH on the original certificate used to enter the regatta:

- 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.
- If the difference is more than 0.1% but less than 0.25%, no penalty shall apply, but a new certificate shall be issued by the Rating Authority 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.
- If the difference is more than 0.25% but less than 0.40%, a boat shall receive a scoring penalty that shall be 50% of the score for Did not Finish, rounded to the nearest whole number (0.5 rounded upward) in any race in which her rating was incorrect. 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.
- If the difference is 0.40% or more, a boat shall be disqualified (DSQ) 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 above (less than 0.1%). Further actions may be taken by the Protest Committee if it may be considered that non-compliance is result of misconduct following procedures defined in the RRS 69.

Test certificates needed for APH comparison shall be run by the relevant rating office. However, if the rating office is not available during the regatta, the Technical Committee may use **ORC Sailor Services** to generate a new test certificate. Any costs involved shall be covered by the unsuccessful party as defined by the RRS 65.2.

c) ***Declared value non-compliance (Crew weight, Asymmetric spinnaker on centerline and Adjusting the base of the mast while racing)*** - Please note that values recorded on the certificate by the owner's declaration such as Crew weight, use of an asymmetric spinnaker tacked only on the centerline and adjusting the base of the mast while racing are not eligible for the APH comparison procedures defined above. Infringement of these rules will result in Disqualification unless any other penalty is defined by the Sailing Instructions.

4.7 Redress

In addition to the options available in RRS A9, if there is a decision by the Protest Committee to grant redress to a competitor in the form of time sailed on the course, this should be expressed in elapsed time rather than corrected time.