



# ORC Race Management & Scoring

Best practices for race managers...and for owners to know

**Dobbs Davis**

ORC Communications Director, US Sailing Certified Measurer

February 27, 2022



# Agenda

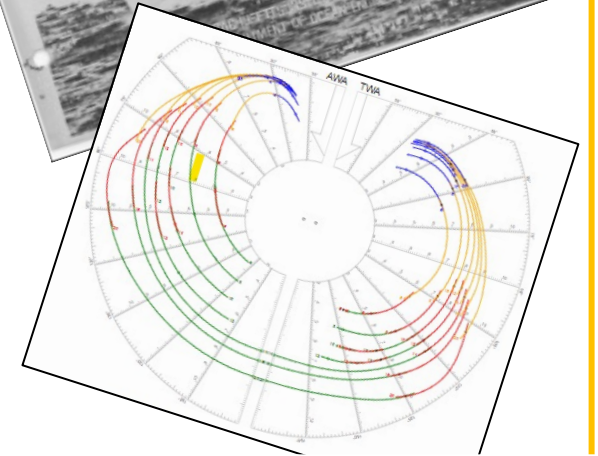
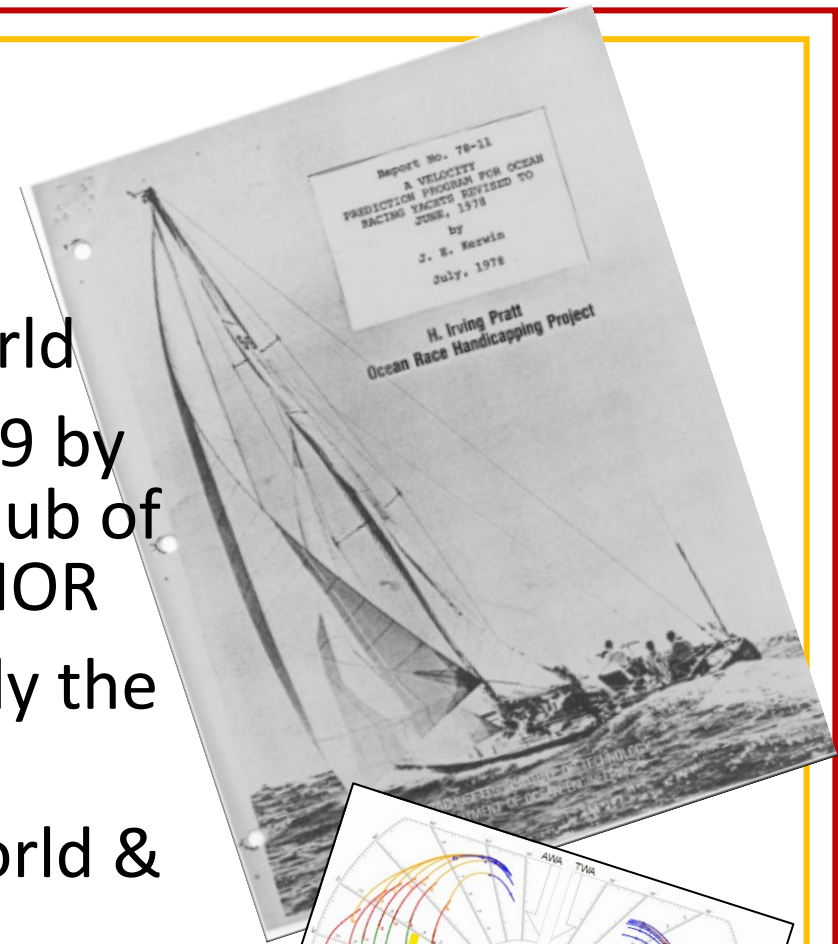
- Basics
- Infrastructure
- Certificate Options
- Scoring Options
- Time allowances
- Resources





# Why ORC?

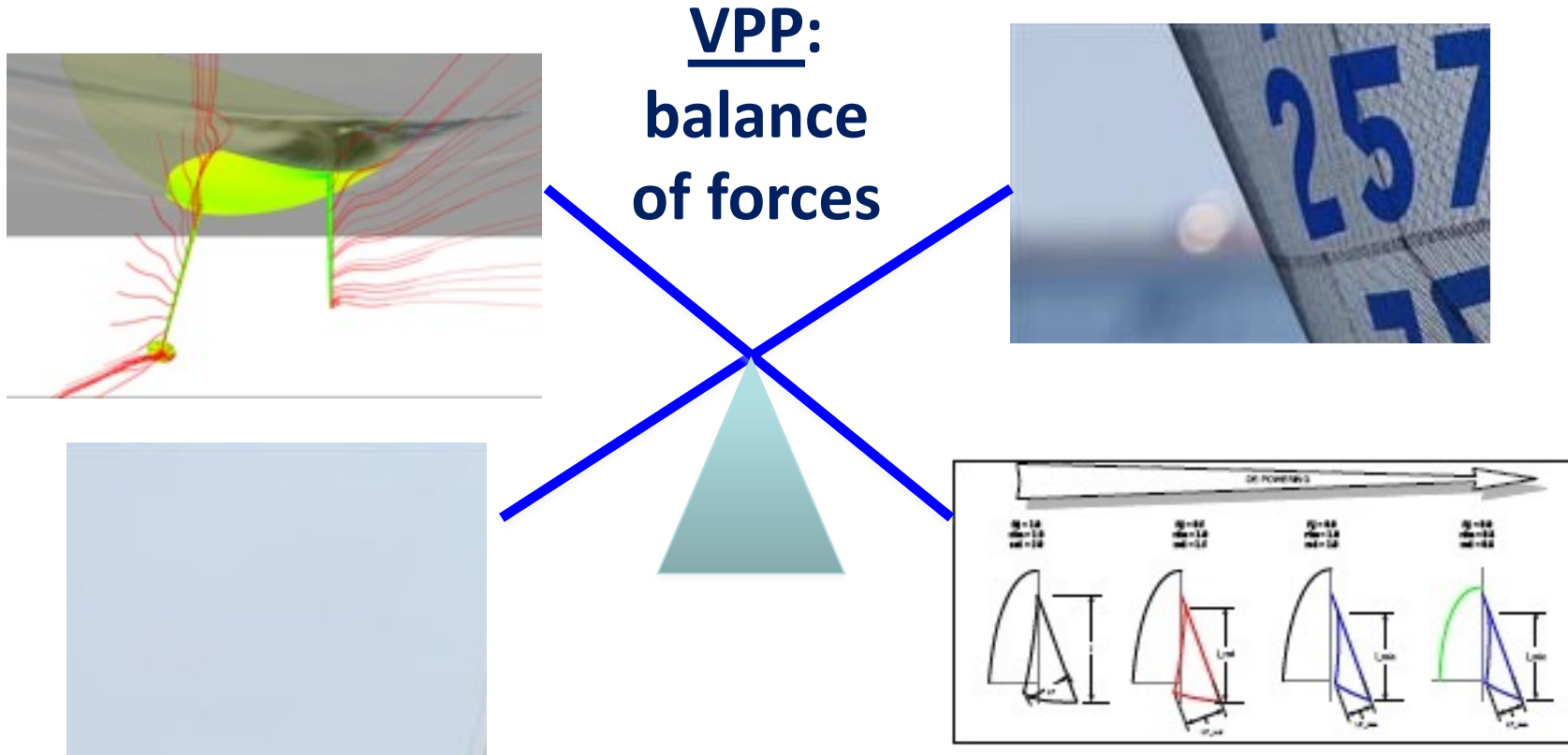
- Largest and most experienced system in the world
- Offshore Racing Congress (ORC) founded in 1969 by the Royal Ocean Racing Club and the Cruising Club of America to develop an int'l handicap standard: IOR
- Advances in technology led to IMS, and currently the ORC rating systems
- Decades of practical experience with annual World & European Championships
- Transparency: everything is published
- Feedback loops from users to help improve the system



**ORC is largest measurement-based rating system in the world – and >1000 US certs in 2021**



# VPP science determines ratings



ORC invests > €50-100K/year on VPP research and development



## VPP science determines ratings

- ORC ratings can be in Time on Time (ToT) or Time on Distance (ToD)
- This is too complex – how can ratings be used in a more practical way?
- On certificates...

Time Allowances in secs/NM							
Wind Velocity	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt
Beat VMG	974.3	795.4	731.0	706.3	693.6	693.9	688.3
52°	629.8	534.8	509.9	499.1	492.9	489.9	482.0
60°	588.3	518.8	493.9	480.9	472.5	466.8	457.3
75°	559.0	507.1	475.4	451.4	438.1	429.7	420.9
90°	563.7	505.8	472.1	437.2	411.1	396.3	380.4
110°	613.7	513.9	469.2	431.7	406.1	385.6	340.7
120°	630.9	520.1	474.1	427.9	390.2	365.6	324.0
135°	697.4	559.5	500.1	456.9	411.7	367.9	294.1
150°	839.2	671.1	558.4	500.2	461.5	421.2	341.9
Run VMG	969.0	774.9	644.8	568.4	520.0	483.8	394.8
Selected Courses							
Windward / Leeward	971.7	785.1	687.9	637.3	606.8	588.9	541.6
All purpose	738.8	612.9	552.2	515.7	489.7	472.3	438.2



# Certificate types

## Standard ORCi and ORC Club

**Club Certificate 2022**

Boat  
**EAGLE**  
USA-38006

US SAILING  
1 ROGER WILLIAMS UNI WAY  
BRISTOL, RI 02809

APH: **509.2**    CDL: **10.591**  
GPH: **570.6**    CertNo: **US6782**

**BOAT**

Class: **SYDNEY 38 OD**  
Designer: **M B & D**  
Builder: **SYDNEY YACHTS**  
Age date: **03/2000**  
Series date: **03/2000**  
Offset file: **sydney39.off**  
Data file: **US6782 Test**

**HULL**

Length Overall: **11.795 m**  
Maximum Beam: **3.706 m**  
Draft: **2.591 m**  
Displacement: **5,490 kg**  
DLR: **4.4373**

IMS Division  
Dynamic Allowance: **0.000%**  
Age Allowance: **0.487%**

**PROPELLER**

Installation: **Strut**  
Type: **Folding 2 blades**  
Diameter: **0.410m**

**CREW**

Maximum weight: **839 kg**  
Minimum weight: **629 kg** \*when applied  
Non Manual Power: **No**  
Crew Arm Extension: **0.00 m**

**SAIL AREAS (m²)**

	Measured	Rated
Mainsail	51.06	52.22
Headsail Luffed	38.88	38.88

Rated boat velocities in knots

**Club Certificate 2022**

Boat  
**ENTROPIA**  
ESP-4223\_C

ORC

RFEV  
c/ Gamazo sn  
39004 Santander – España  
crucero@rfev.es

APH: **551.0**    CDL: **8.789**  
GPH: **617.2**    CertNo: **4223R1**

**BOAT**

Class: **J.O.D.35**  
Designer: **D. ANDRIEU**  
Builder: **JEANNEAU**  
Age date: **06/1993**  
Series date: **03/1991**  
Offset file: **F003.OFF**  
Data file:

**HULL**

Length Overall: **10.630 m**  
Maximum Beam: **3.494 m**  
Draft: **1.982 m**  
Displacement: **3,811 kg**  
DLR: **4.2190**  
IMS Division: **Performance**  
Dynamic Allowance: **0.000%**  
Age Allowance: **0.487%**

**PROPELLER**

Installation: **Shaft exposed**  
Type: **Feathering 3 blades**  
Diameter: **0.355m**

**CREW**

Maximum weight: **170 kg**  
Minimum weight: **120 kg** \*when applied  
Non Manual Power: **Rig**  
Crew Arm Extension:

**SAIL AREAS (m²)**

**International Certificate 2022**

Boat  
**TANIT IV - MEDILEVEL**  
ESP-7625

RFEV  
c/ Gamazo sn  
39004 Santander – España  
crucero@rfev.es

APH: **545.2**    CDL: **9.778**  
GPH: **613.0**    CertNo: **762501**

**BOAT**

Class: **GRAND SOLEIL 37 BC**  
Designer: **BOTIN/CARKEEK**  
Builder: **DEL PARDO**  
Age date: **11/2005**  
Series date: **05/2005**  
Offset file: **GS37BC-ESP7625.off**  
Data file:

**HULL**

Length Overall: **11.310 m**  
Maximum Beam: **3.674 m**  
Draft: **2.448 m**  
Displacement: **7,084 kg**  
DLR: **6.5421**  
IMS Division: **Cruiser/Racer**  
Dynamic Allowance: **0.216%**  
Age Allowance: **0.487%**

**PROPELLER**

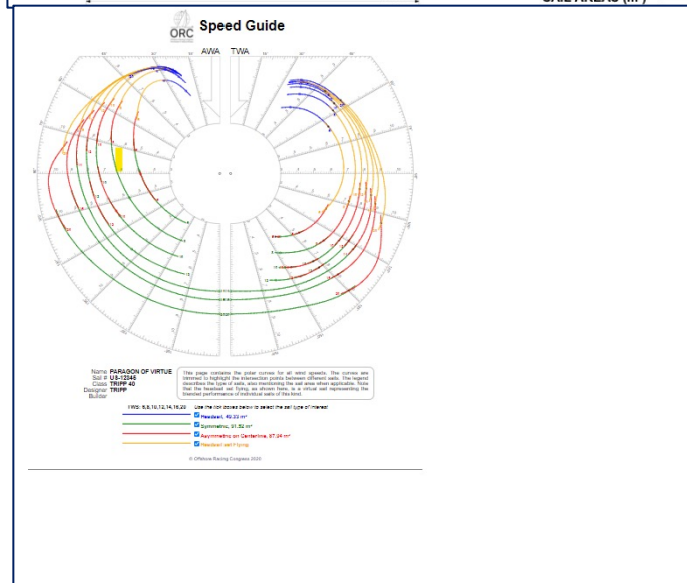
Installation: **Strut**  
Type: **Folding 2 blades**  
Diameter: **0.450m**

**CREW**

Maximum weight: **627 kg**  
Minimum weight: **470 kg** \*when applied  
Non Manual Power: **No**  
Crew Arm Extension:

**SAIL AREAS (m²)**

- Also ORC DH and ORC Non-Spin – avail for no charge
- All certs are HTML





# Race Admin tips

## NOR:

- Make explicit ORC Rules are in effect
- State scoring style used, specific for offshore races, generalized for inshore or coastal races
- Eligibility: any valid ORC certificate, or specify ORCi if desired
- Deadlines for valid certificates: recommend *2 weeks minimum* before racing
- State how to apply for certificates: US Sailing link

## SI's:

- ORC Rules in effect
- Scoring styles intended: eg, Triple Number or APH
- Provide scratch sheet time allowance options at or before Skipper's Briefing





# Race Admin tips - Stability

US SER's specify minimum Stability Index standards for Coastal (105) and Offshore (115) categories

Yet, many OA's do not address nor enforce this among their entries.

Stability Index is determined by the boat having had freeboards measured and an inclination by a certified measurer.

All ORCi certificates but only Measured ORC Club certificates will have a Stability Index published on Page 1 of the certificate >>>>



STABILITY	
Righting Moment	83.8 kg·m
Stability Index	N/A

<-- Unmeasured

Measured -->

STABILITY	
Righting Moment	67.8 kg·m
Stability Index	122.4





## More Race Admin tips:

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In NOR specify where to get application information for ORC certificates:

<https://www.ussailing.org/competition/offshore/orc>



# Scoring Options

- Found on Page 2 of all ORC certificates
- Options are tailored to be scoring styles requested for use in each country
- No surprise USA has the most options!
- Choice should be generally described in the NOR (eg, “ORC Time on Time scoring”) because allows flexibility
- Everyone in the USA seems to use ToT
- In SI’s should be more specific: eg, “Triple Number ToT”

**General Principle: the closer you match the course type and wind speeds the better and more fair results you will have**



Club  
Certificate  
2022

Boat  
**EAGLE**  
USA-38006

US SAILING  
1 ROGER WILLIAMS UNI WAY  
BRISTOL, RI 02809



Wind Velocity	Time Allowances in secs/NM						
	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt
Beat VMG	933.2	767.1	682.7	655.7	644.4	633.8	623.1
52°	614.7	517.1	479.2	467.9	462.8	460.1	450.9
60°	582.8	499.1	468.1	455.5	449.7	446.2	435.2
75°	559.2	487.8	459.6	440.8	428.3	421.5	414.0
90°	554.7	478.0	448.3	430.1	416.5	400.3	384.0
110°	570.7	484.3	450.3	421.7	395.5	374.6	347.8
120°	601.6	498.8	457.0	427.0	397.8	370.6	326.8
135°	676.0	544.7	480.0	449.3	420.6	392.3	335.2
150°	807.2	639.1	538.4	480.7	450.9	424.1	371.7
Run VMG	932.0	738.0	621.6	547.2	499.4	465.2	414.9
Selected Courses							
Windward / Leeward	932.6	752.5	652.1	601.4	571.9	549.5	519.0
All purpose	712.6	587.4	525.3	493.5	473.1	456.1	429.7

Single Number Scoring Options		
Course	Time On Distance	Time On Time
Windward / Leeward	628.0	0.9554
All purpose	509.2	1.1783

## Custom scoring options for United States of America

Single Number	Time On Distance	Time On Time
Triple Number All Purpose Low	650.0	0.9231
Triple Number All Purpose Medium	506.8	1.1839
Triple Number All Purpose High	450.5	1.3320
Triple Number Windward/Leeward Low	842.6	0.7121
Triple Number Windward/Leeward Medium	623.5	0.9623
Triple Number Windward/Leeward High	543.7	1.1036
Predominantly Upwind	549.5	1.0918
Predominantly Downwind	520.5	1.1528
Predominantly Upwind Low	718.5	0.8351
Predominantly Upwind Medium	565.0	1.0620
Predominantly Upwind High	530.8	1.1303
Predominantly Downwind Low	720.0	0.8333
Predominantly Downwind Medium	519.7	1.1544
Predominantly Downwind High	427.7	1.4029
Chicago-Mac Upwind		1.0754
Chicago-Mac All Purpose		1.1020
Chicago-Mac Downwind		1.1332
Bayview-Mac Cove Island		1.0293
Bayview-Mac Shore		1.0405
Harvest Moon Regatta	448.3	1.3383
Victoria-Maui		1.2176

5-Band Windward/Leeward	Time On Distance	Time On Time
5-Band Low	918.7	0.6531
5-Band Low / Medium	770.1	0.7792
5-Band Medium	613.1	0.9786
5-Band Medium / High	552.5	1.0859
5-Band High	524.3	1.1445



# Scoring Options

- Numerous options for course and distance racing
- Single number W/L and APH also available at top of the page
- New 5-Band option promoted by NYYC and Storm Trysail
- Most popular is Triple Number and APH for long distance racing
- Point to point coastal races can be scored by Triple Number, APH or other options

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Bayview-Mac Cove Island		1.0293
Bayview-Mac Shore		1.0405
Harvest Moon Regatta	448.3	1.3383
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5-Band Windward/Leeward	Time On Distance	Time On Time
5-Band Low	918.7	0.6531
5-Band Low / Medium	770.1	0.7792
5-Band Medium	613.1	0.9786
5-Band Medium / High	552.5	1.0859
5-Band High	524.3	1.1445

Single Number Scoring Options		
Course	Time On Distance	Time On Time
Windward / Leeward	601.8	0.9971
All purpose	486.3	1.2338



# Scoring Option details

All-Purpose: APH

<i>TWS (kt)</i>	<b>6</b>	<b>8</b>	<b>10</b>	<b>12</b>	<b>14</b>	<b>16</b>	<b>20</b>
<i>Time Allowance percentage</i>	5%	10%	20%	30%	20%	10%	5%

Triple Number: TN

- Wind speed ranges used on multiple course types

TWS (kt)	6	8	10	12	14	16	20
Low	50%	50%					
Medium		8.4%	33.3%	33.3%	25%		
High					25%	37.5	37.5%

## Upwind

<i>TWS (kt)</i>	<b>8</b>	<b>12</b>	<b>16</b>
<i>Beat VMG</i>	10%	15%	7%
<b>52°</b>	10%	15%	9%
<b>90°</b>	5%	7%	3%
<b>135°</b>	4%	5%	2%
<i>Run VMG</i>	3%	4%	1%

## Downwind

<i>TWS (kt)</i>	<b>8</b>	<b>12</b>	<b>16</b>
<i>Beat VMG</i>	3%	4%	1%
<b>52°</b>	4%	5%	2%
<b>90°</b>	5%	7%	3%
<b>135°</b>	10%	15%	9%
<i>Run VMG</i>	10%	15%	7%

Predominant Upwind and Downwind

- Can be broken into Triple Number wind speeds

# Scoring Options – choosing coastal & offshore

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- Offshore races: use APH unless there's a race-specific scoring model
- Coastal races (eg, 4-12 hour duration): if point-point, use directional options...if steady wind, consider using TN (Low, Medium or High).
- If multiple legs with no predominant direction, use APH modified by TN of breeze is steady during the race for all participants



# Scoring Options – W/L or short coastal

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- Races of short duration, 1-2 hours
  - Triple Number is best, with W/L course model
  - Use APH if multiple non-W/L wind angles, and TN choice for wind speed
  - But what about choosing Low, Medium or High???



# Triple Number Scoring Options – LOW

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- Wind speed: 6-8 knots
- How is this determined?
  - Direct measurement from signal and/or mark boats
  - Observe the fleet: heavy boats crew to leeward upwind, light boats barely hiking
  - Poll a reliable source
  - Think about forecast trend: is it going to build or die off?



# Triple Number Scoring Options – MEDIUM

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- Wind speed: 8 - 14 knot blend
- How is this determined?
  - Direct measurement from signal and/or mark boats
  - Observe the fleet: every boat hiking upwind, traveler's down, deeper angles downwind
  - Be careful with sportboats: they will look powered up also in LOW conditions





## Triple Number Scoring Options – HIGH

- Wind speed: 14 – 20 knot blend
- How is this determined?
  - Direct measurement from signal and/or mark boats
  - Observe the fleet: every boat hiking hard upwind, deep angles downwind, possible broaches
- Sea state: choppy and/or waves



# Triple Number – when to decide?

Best practices:

- Announce intent on what to use before Warning signal
- If conditions and decision changes, announce prior to finish of first boat in the class
- Ensure SI prevents redress on decisions – eg, “Scoring choices are not subject to redress.”





# Add'l scoring resources

More info on ORC Scoring available in ORC Race Management Guidebook – available at [www.orc.org/rules](http://www.orc.org/rules)

Valuable resource for best practices in race management, but Scoring section covers only single-number solutions and Polar Curve Scoring (PCS), the most accurate form of ORC scoring.

PCS needs course length, geometry and True Wind Direction (and current vectors), but currently no US events are using PCS. But it will come...

World Leader in Rating Technology  
**OFFSHORE RACING CONGRESS**

ORC Race Management Guide 2022

# Time allowances

- ORC Scratch Sheet available online at ORC Sailor Services
- Search for boats with valid certificates in the ORC database
- Click on to add to Scratch Sheet
- Select scoring choice
- Output is HTML file that allows users to select their boat within the class



## Scratch Sheet

### Triple ToT Windward/Leeward Low

	Yacht Name	Sail No	Type	GPH	TOT	1 min	5 min	10 min	20 min	30 min	60 min	300 min
<input type="radio"/>	Lorelei	USA 140	Hanse 348	705.3	0.5485	26.9 00:00:27	134.5 00:02:15	269.0 00:04:29	538.0 00:08:58	807.0 00:13:27	1613.9 00:26:54	8069.6 02:14:30
<input type="radio"/>	REVOLUTION	4515	CS 30	676.0	0.6206	16.8 00:00:17	84.0 00:01:24	168.0 00:02:48	336.1 00:05:36	504.1 00:08:24	1008.2 00:16:48	5040.9 01:24:01
<input type="radio"/>	Growth Spurt	USA 261	J-109	610.6	0.6629	11.9 00:00:12	59.5 00:00:60	119.0 00:01:59	238.0 00:03:58	357.1 00:05:57	714.1 00:11:54	3570.7 00:59:31
<input type="radio"/>	Overproof	USA 61388	Open 30	589.7	0.7232	5.9 00:00:06	29.5 00:00:30	59.1 00:00:59	118.1 00:01:58	177.2 00:02:57	354.4 00:05:54	1772.1 00:29:32
<input type="radio"/>	ARTEMIS	USA 21	Italia 13.98	546.8	0.7381	4.6 00:00:05	22.9 00:00:23	45.8 00:00:46	91.5 00:01:32	137.3 00:02:17	274.6 00:04:35	1373.0 00:22:53
<input type="radio"/>	Second Wind	51316	J130	548.3	0.7415	4.3 00:00:04	21.4 00:00:21	42.8 00:00:43	85.6 00:01:26	128.4 00:02:08	256.8 00:04:17	1284.2 00:21:24
<input checked="" type="radio"/>	PALAEON	USA 93145	J-145	514.0	0.7944	0.0 00:00:00	0.0 00:00:00	0.0 00:00:00	0.0 00:00:00	0.0 00:00:00	0.0 00:00:00	0.0 00:00:00
<input type="radio"/>	XL	USA-45000	ANTRIM 40	517.9	0.7968	-0.2 00:00:00	-0.9 00:00:01	-1.8 00:00:02	-3.6 00:00:04	-5.4 00:00:05	-10.8 00:00:11	-54.2 00:00:54
<input type="radio"/>	Rigadoon	103	DUNNING 44	460.6	0.8789	-5.8 00:00:06	-28.8 00:00:29	-57.7 00:00:58	-115.4 00:01:55	-173.1 00:02:53	-346.1 00:05:46	-1730.6 00:28:51
<input type="radio"/>	GLORY	USA 88008	TRANSPAC 52	452.4	0.9006	-7.1 00:00:07	-35.4 00:00:35	-70.8 00:01:11	-141.5 00:02:22	-212.3 00:03:32	-424.5 00:07:05	-2122.6 00:35:23

\*make sure to note this is a guide only, NOT used for official results



# Scoring programs

## Favorable features needed:

- **Entry of valid ORC certificate reference number (at the bottom of every page on certificates)**
- **Program query retrieves each boat's scoring data from the ORC database**
- **Program offers scoring options to admin**
- **List of entries should display GPH/APH numbers with hotlinks to certificate copy**
- **Other programs will only allow manual entry based from certificate data**





Thanks  
and  
Questions

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