

APPENDIX 4

USA-CAN Standard Scoring Models

General: In the new 2023 USA-CAN certificate design, there are some new formulations added from 2022 on Page 2 of all ORC certificates.

1. **Single Number** rating options remain the same.

Windward/Leeward ratings are calculated based on a course model that is 50% upwind VMG and 50% downwind VMG.

The **All Purpose** model is based on an equal mix of all wind angles.

Single Number Scoring Options		
Course	Time On Distance	Time On Time
Windward / Leeward	509.3	1.1781
All purpose	412.3	1.4552

Both models condense the rating into a single number based on this mix of wind speeds:

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

2. Other options include **Triple Number** for All Purpose, Windward/Leeward and Predominant wind direction models – **Upwind**, **Downwind** and a new **Reaching** model. Triple Number wind speed mixes are shown here for the **Low**, **Medium** and **High** wind band ranges:

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%

3. **Predominant wind direction** models for **single number** ratings are shown here:

Upwind

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

Downwind

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

Reaching

TWS (kt)	8	12	16
Beat VMG	2%	4%	2%
52°	6%	8%	4%
90°	12%	18%	8%
135°	8%	12%	8%
Run VMG	2%	4%	2%

Predominant wind direction models for Triple number LOW ratings are shown here:

Upwind LOW

TWS (kt)	6	8
Beat VMG	20%	25%
52°	15%	10%
90°	5%	5%
135°	5%	5%
Run VMG	5%	5%

Downwind LOW

TWS (kt)	6	8
Beat VMG	5%	5%
52°	5%	5%
90°	5%	5%
135°	15%	10%
Run VMG	20%	25%

Reaching LOW

TWS (kt)	6	8
Beat VMG	2.5%	2.5%
52	10.0%	10.0%
90	15.0%	20.0%
135	15.0%	20.0%
Run VMG	2.5%	2.5%

Predominant wind direction models for Triple number MEDIUM ratings are shown here:

Upwind MEDIUM

TWS (kt)	8	10	12	14
Beat VMG	5%	15%	15%	12%
52°	3%	12%	12%	8%
90°	0.4%	4.3%	4.3%	3%
135°	0	1%	1%	1%
Run VMG	0	1%	1%	1%

Downwind MEDIUM

TWS (kt)	8	10	12	14
Beat VMG	0	1%	1%	1%
52°	0	1%	1%	1%
90°	0.4%	4.3%	4.3%	3%
135°	3%	12%	12%	8%
Run VMG	5%	15%	15%	12%

Reaching MEDIUM

TWS (kt)	8	10	12	14
Beat VMG	0.5%	2.0%	2.0%	0.5%
52	2.5%	7.5%	7.5%	2.5%
90	7.5%	10.0%	10.0%	7.5%
135	7.5%	10.0%	10.0%	7.5%
Run VMG	0.5%	2.0%	2.0%	0.5%

Predominant wind direction models for Triple number MEDIUM ratings are shown here:

Upwind HIGH

TWS (kt)	14	16	20
Beat VMG	12%	18%	18%
52°	8%	12%	12%
90°	3%	5.5%	5.5%
135°	1%	1%	1%
Run VMG	1%	1%	1%

Downwind HIGH

TWS (kt)	14	16	20
Beat VMG	1%	1%	1%
52°	1%	1%	1%
90°	3%	5.5%	5.5%
135°	8%	12%	12%
Run VMG	12%	18%	18%

Reaching HIGH

TWS (kt)	14	16	20
Beat VMG	1.0%	3.0%	1.0%
52	5.0%	10.0%	5.0%
90	10.0%	15.0%	10.0%
135	10.0%	15.0%	10.0%
Run VMG	1.0%	3.0%	1.0%

4. The 5-band Windward/Leeward course model is based on this matrix of wind speeds for 50% Upwind VMG and 50% Downwind VMG wind angles:

TWS	6 kt	8 kt	10 kt	12 kt	14 kt	16 kt	20 kt
Low	92.3%	7.7%					
L/M	26.9%	46.2%	19.2%	7.7%			
Med		7.7%	19.2%	46.2%	19.2%	7.7%	
M/H				7.7%	19.2%	55.8%	17.3%
High						17.3%	82.7%

5. Race-specific course model matrices shown on USA-CAN certificates are shown here:

Chicago Mac Upwind

	TWS						
TWA	6 Kts	8 Kts	10 Kts	12 Kts	16 Kts	20 Kts	
Optimum Beat	1.75%	5.25%	10.50%	10.50%	5.10%	1.60%	34.70%
52 deg Reach	1.40%	4.35%	9.00%	9.30%	5.10%	1.80%	30.95%
90 deg Reach	0.75%	2.25%	4.50%	4.50%	2.40%	0.90%	15.30%
135 deg Reach	0.60%	1.80%	3.30%	3.30%	1.50%	0.45%	10.95%
Optimum Run	0.50%	1.35%	2.70%	2.40%	0.90%	0.25%	8.10%
Sum	5.00%	15.00%	30.00%	30.00%	15.00%	5.00%	100.00%

Chicago Mac All-Purpose

	TWS						
TWA	6 Kts	8 Kts	10 Kts	12 Kts	16 Kts	20 Kts	
Optimum Beat	1.45%	3.90%	6.90%	6.00%	2.40%	0.60%	21.25%
52 deg Reach	0.700%	2.40%	5.40%	6.00%	3.15%	1.10%	18.75%
90 deg Reach	0.700%	2.40%	5.40%	6.00%	3.90%	1.60%	20.00%
135 deg Reach	0.700%	2.40%	5.40%	6.00%	3.15%	1.10%	18.75%
Optimum Run	1.45%	3.90%	6.90%	6.00%	2.40%	0.60%	21.25%
Sum	5.00%	15.00%	30.00%	30.00%	15.00%	5.00%	100.00%

Chicago Mac Offwind

	TWS						
TWA	6 Kts	8 Kts	10 Kts	12 Kts	16 Kts	20 Kts	
Optimum Beat	0.50%	1.35%	2.70%	2.40%	0.90%	0.25%	8.10%
52 deg Reach	0.60%	1.80%	3.30%	3.30%	1.50%	0.45%	10.95%
90 deg Reach	0.75%	2.25%	4.50%	4.50%	2.40%	0.90%	15.30%
135 deg Reach	1.40%	4.35%	9.00%	9.30%	5.10%	1.80%	30.95%
Optimum Run	1.75%	5.25%	10.50%	10.50%	5.10%	1.60%	34.70%
Sum	5.00%	15.00%	30.00%	30.00%	15.00%	5.00%	100.00%

Course models for the **Bayview-Mackinac Race** are as follows:

Cove Island Course

Wind (knots):	6	8	10	12	16
VMG Up	6.000%	8.125%	6.250%	3.938%	1.250%
60	5.250%	7.500%	6.250%	4.500%	1.875%
90	0.000%	2.500%	5.000%	6.750%	5.000%
120	0.000%	1.875%	3.750%	5.063%	3.750%
VMG Dn	3.750%	5.000%	3.750%	2.250%	0.625%

Shore Course

Wind (knots):	6	8	10	12	16
VMG Up	6.000%	6.250%	5.000%	3.000%	1.000%
60	6.000%	6.250%	5.000%	3.000%	1.000%
90	2.000%	3.750%	5.000%	5.000%	3.000%
120	1.000%	3.125%	5.000%	5.500%	3.500%
VMG Dn	5.000%	5.625%	5.000%	3.500%	1.500%

The **Harvest Moon Regatta** course model is:

TWA - TWS	6	8	10	12	14	16	20
VMG up	0.5	1.0	1.0	0.5	0.5	0.0	0.0
60	1.0	2.0	2.0	4.0	4.0	1.0	0.0
90	0.0	0.0	5.0	6.5	6.5	8.0	5.0
120	0.0	0.0	1.0	5.5	8.0	8.0	4.0
150	0.0	0.0	1.0	3.0	5.0	5.0	4.0
VMG down	0.5	0.5	0.5	0.5	2.0	2.0	1.0

The **Victoria-Maui Race** course model is:

True Wind Angle	True Wind Speed (kts)						
	6	8	10	12	14	16	20
VMG BEAT	1.6%	1.2%	0.9%	0.4%	0.3%	0.1%	0.1%
60	1.1%	0.6%	0.6%	0.7%	0.3%	0.1%	0.4%
90	1.2%	2.1%	2.3%	1.1%	0.9%	0.1%	0.7%
110	1.0%	1.2%	1.6%	1.9%	1.5%	1.1%	2.2%
120	0.4%	0.7%	1.4%	2.7%	1.8%	0.8%	1.2%
135	0.2%	0.8%	0.7%	0.7%	0.7%	0.5%	2.0%
150	1.6%	3.9%	5.1%	5.1%	4.2%	3.6%	6.1%
VMG RUN	0.3%	1.5%	3.9%	4.0%	6.3%	6.0%	6.5%

Courses used in the **StFYC's Rolex Big Boat Series** are:

San Francisco Bay Heavy

	Single Number							Sum
	6 Knots	8 Knots	10 Knots	12 Knots	14 Knots	16 Knots	20 Knots	
Optimum Beat	0.00%	0.00%	0.00%	5.41%	0.00%	28.03%	15.75%	49.19%
52 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.81%	1.61%
60 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
75 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
90 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
110 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	1.03%	0.00%	1.03%
120 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	2.23%	0.51%	2.74%
135 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	5.49%	2.95%	8.44%
150 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	5.49%	3.47%	8.96%
Optimum Run	0.00%	0.00%	0.00%	5.29%	0.00%	14.13%	8.60%	28.01%
Sum	0.00%	0.00%	0.00%	10.70%	0.00%	57.20%	32.10%	100.00%

San Francisco Bay Medium

	Single Number							Sum
	6 Knots	8 Knots	10 Knots	12 Knots	14 Knots	16 Knots	20 Knots	
Optimum Beat	0.00%	10.83%	14.01%	14.01%	0.00%	10.34%	0.00%	49.19%
52 deg Reach	0.00%	0.00%	0.40%	0.40%	0.00%	0.81%	0.00%	1.61%
60 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
75 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
90 deg Reach	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
110 deg Reach	0.00%	0.00%	0.51%	0.51%	0.00%	0.00%	0.00%	1.03%
120 deg Reach	0.00%	0.00%	1.12%	1.12%	0.00%	0.51%	0.00%	2.74%
135 deg Reach	0.00%	0.00%	2.75%	2.75%	0.00%	2.95%	0.00%	8.44%
150 deg Reach	0.00%	0.00%	2.75%	2.75%	0.00%	3.47%	0.00%	8.96%
Optimum Run	0.00%	10.57%	7.06%	7.06%	0.00%	3.32%	0.00%	28.02%
Sum	0.00%	21.40%	28.60%	28.60%	0.00%	21.40%	0.00%	100.00%

SF W/L 60-40**Low**

	6 Knots	8 Knots	10 Knots	12 Knots	14 Knots	16 Knots	20 Knots	Sum
Optimum Beat	30.00%	30.00%	0.00%	0.00%	0.00%	0.00%	0.00%	60.00%
Optimum Run	20.00%	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%	40.00%
Sum	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%

SF W/L 60-40**Medium**

	6 Knots	8 Knots	10 Knots	12 Knots	14 Knots	16 Knots	20 Knots	Sum
Optimum Beat	0.00%	5.63%	22.29%	22.29%	16.75%	0.00%	0.00%	66.96%
Optimum Run	0.00%	2.77%	11.01%	11.01%	8.25%	0.00%	0.00%	33.04%
Sum	0.00%	8.40%	33.30%	33.30%	25.00%	0.00%	0.00%	100.00%

SF W/L 60-40**High**

	6 Knots	8 Knots	10 Knots	12 Knots	14 Knots	16 Knots	20 Knots	Sum
Optimum Beat	0.00%	0.00%	0.00%	0.00%	16.75%	25.13%	25.13%	67.01%
Optimum Run	0.00%	0.00%	0.00%	0.00%	8.25%	12.37%	12.37%	32.99%
Sum	0.00%	0.00%	0.00%	0.00%	25.00%	37.50%	37.50%	100.00%