

North American
Portsmouth Yardstick
Handbook

A service to sailors from



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I. Introduction

The North American Portsmouth Yardstick is an empirical handicapping system meant to provide equitable scoring of race results for different boats sailing the same course. The system originated from an effort led by the Dixie Inland Yacht Racing Association (DIYRA) based on the Royal Yachting Association Portsmouth Numbers (PN) scheme. Nationwide participation in the Dixie Portsmouth Numbers (D-PN) system culminated in the transfer of administrative responsibility to the United States Sailing Association, then the North American Yacht Racing Union, in 1973. The system is managed by the Portsmouth Numbers Committee of the United States Sailing Association.

By providing a large variety of readily calculable, verified handicaps to the sailing community, the North American Portsmouth Yardstick allows for expanded participation in the sport beyond one-design and class events. This Handbook documents the theory and application of the D-PN system. We encourage you to find a local fleet or start a race series yourself! US Sailing proudly supports the North American Portsmouth Yardstick.

II. Theory and Methodology

The Portsmouth scheme derives handicaps from consideration of documented race results in a variety of sailing conditions in the context of the performance characteristics of each boat. Physically, Portsmouth Numbers reflect the length of time boats will take to sail a common but unspecified distance. That is to say, a boat assigned D-PN=80 will sail the same distance in 80 minutes as a boat assigned D-PN=90 will sail in 90 minutes. In this way, the Numbers provide a direct comparison of the performance of different classes, facilitating fair handicapping of race results.

To gauge performance, the North American Portsmouth Yardstick recognizes all boats as belonging to one of five recognized classes (Centerboard, Multihull, Windsurfer, Keelboat, and Offshore). The performance of given class is indicated by the corresponding Measured Rating (MR), Pacific Multihull Rating (PMR), and Derived Rating (DR) formulae (see Table III). A rating formula is offered for each of the five classes and relies on certain principle dimensions to assess the performance of boats belonging to that class. A boat is further categorized beyond the five basic classes as a specific type. These types are meant to group boats with similar performance characteristics. Using race results provided by participating clubs, a linear regression is drawn between observed results and the appropriate MR, PMR, or DR to develop a D-PN correlation for each type (see Table IV).

These formulae simplify handicapping as only certain principle dimensions are required to calculate the appropriate rating and corresponding D-PN. The race results used in the regression are carefully analyzed considering the performance of each boat relative to well documented reference boats, the Primary and Secondary Yardsticks, to ensure appropriate handicaps are assessed and to protect the integrity of the system.

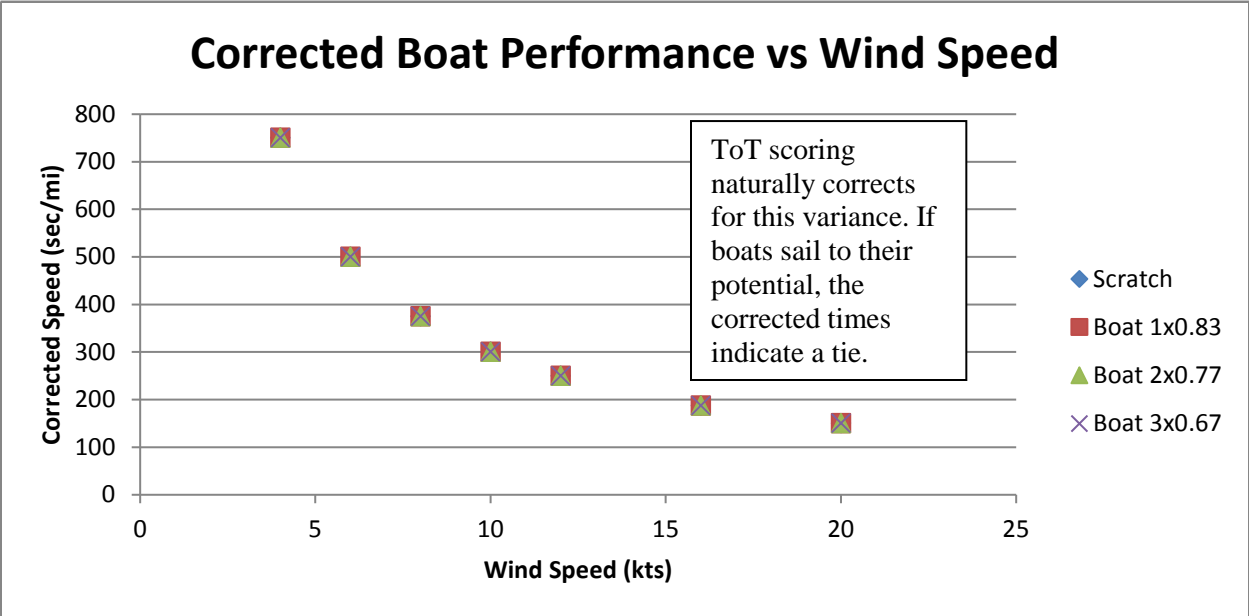
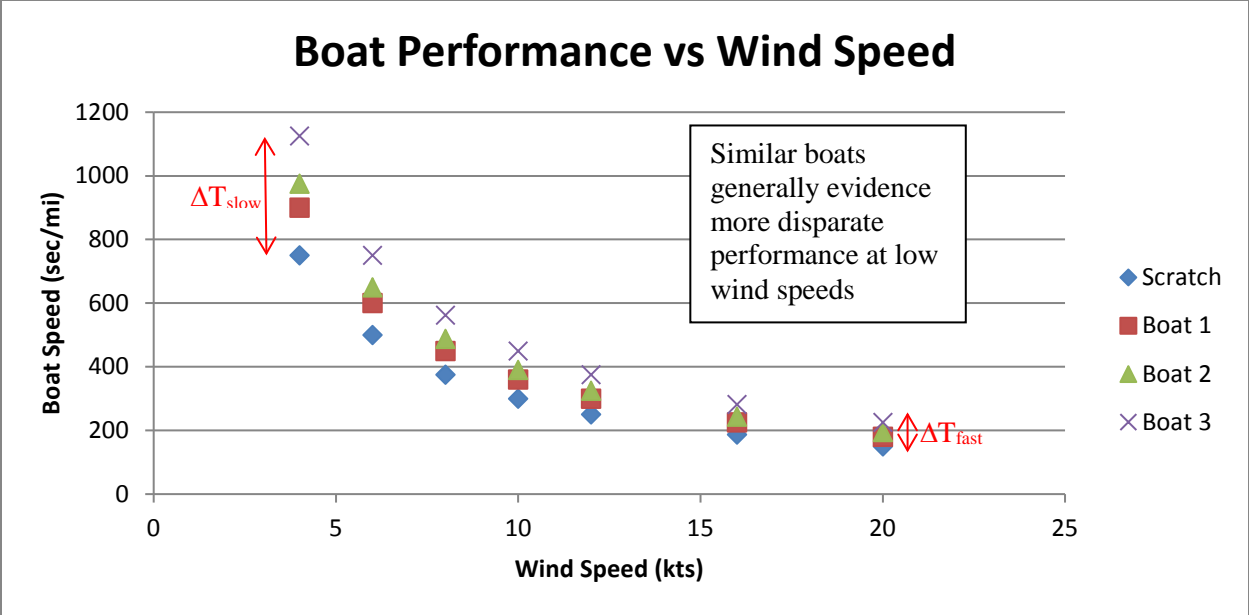
The Primary Yardstick for the North American Portsmouth Yardstick is the Thistle (83.0). This class was selected in 1961 because of its strong class organization, the wide geographic distribution of active fleets, and diverse racing activity at local clubs. The rating of 83.0 keyed the formulation of early D-PN for boats previously sailed under the Royal Yachting Association Portsmouth Numbers (PN). Since the origination of the D-PN system, several Secondary Yardsticks have been defined as classes with highly repeatable D-PN handicaps. These Secondary Yardsticks are useful in the consideration of a more diverse range of race results, which allowed for the expansion and continued success of the D-PN system. The handicaps for all recognized Yardsticks are presented in Table VII.

The handicaps are implemented in a Time-on-Time (ToT) scoring system. The generalized form for ToT scoring is simply:

$$CT = ET \times TCF$$

where *CT* = Corrected Time
ET = Elapsed Time
TCF = Time Correction Factor

By using a multiplicative correction factor as opposed to an additive factor as in Time-on-Distance (ToD) scoring, a degree of performance variance with wind speed is naturally accounted for. This behavior is illustrated in the diagrams below.



When highly disparate boats are competing against each other or when boat performance is especially sensitive to changes in wind speed (e.g. planing hulls and catamarans), the need for more sophisticated handicapping becomes apparent. The Wind Handicap (HC) system is a multi-number extension of the D-PN system conceived by the DIYRA Portsmouth Numbers Committee to account for varied boat performance across a range of wind and sea conditions to correct elapsed times. HC numbers are assigned corresponding to the Beaufort Wind Scale and offer an enhanced scoring option compared to the standard D-PN system.

To determine HC handicaps, race results for each of the recognized types are analyzed to assess D-PN adjustment factors for each Beaufort Condition (see Table IV). Recognized as a stable performer across all wind speeds, the Thistle is assigned a level handicap (83.0) across the Beaufort Scale and is recognized as the Primary Yardstick in the assignment HC handicaps.

Inherent assumptions made in generating Portsmouth Numbers include:

- The boat placing first in each class was sailed to its true potential by a perfect crew according to flawless strategy
- All boats sailed the same course, experienced the same wind/water conditions and degree of interference with clear air
- All boats conform to class specifications and rules
- Boats with extended sail inventories utilize the proper sails for the wind conditions and legs of the course

Some further assumptions are made in the assessment of handicaps for offshore classes. The D-PN and HC figures for offshore classes are representative of a “base boat” in that class reflecting a typical sail inventory, engine type, propeller installation, etc. A standard offshore class boat is considered to be equipped as follows (with specific exceptions where defined by class rules or manufacturer specifications):

- Boat is in racing condition (e.g. updated sail set, clean bottom, well-practiced crew)
- Headsail Luff Perpendicular (HLP%) between 150%-155% of the fore triangle base (J)
- Spinnaker Pole Length (SPL) equal to J
- Spinnaker Maximum Width (SMW) 180% of J
- Spinnaker Luff (SLU) 95% of forestay length (FL)
- Full length battens
- Hull and appendages are unmodified from stock configuration
- Lightweight engine
- Folding or feathering propeller for out of aperture installations
- Solid 2-blade propeller for in aperture installation
- Outboard engines are retractable

Certain adjustments can be made for deviations and modifications from this base configuration using both standard modification factors (see Table VI) and the discretion of the local race administrator. These modification factors have been derived from rating formulae rather than from empirical race data. Clubs are urged to submit their recommendations for new modification listings to the Portsmouth Numbers Committee for inclusion in future Yardsticks. The Portsmouth Numbers Committee should be consulted for the handicapping of highly modified boats.

III. Application

The appropriate scoring method should be defined in the Notice of Race

- Basic North American Portsmouth Number (D-PN)
- Wind Handicap Numbers (HC)
- Modified D-PN or HC (see Table VI)

When the Notice of Race identifies the North American Portsmouth Yardstick as the handicapping system, a boat's assigned handicap constitutes a rating certificate and teams are subject to the requirements of the Racing Rules of Sailing - Compliance with Class Rules; Certificates.

When using the HC system, an anemometer is recommended to assess the average Beaufort Condition for the race (see Table I). HC handicaps are calculated using HC factors from Table IV as:

$$HC = (f)(D - PN)$$

where f = HC factor corresponding to the average Beaufort Condition

Race committees should require all participants to race in class configuration. When no class rules or class organization exists, race committees should establish that a particular entrant conforms to the base boat description outlined in this Handbook. Where modifications exist, corresponding handicap adjustments should be assessed by standard factors (see Table VI) or by the judgment of the Race Committee. Standard adjustments from Table VI may be applied as:

$$D - PN_{mod} = (D - PN)(MF)$$

HC handicaps may be modified similarly. It is recommended that no more than two modification adjustments be made and that combined allowances or penalties not exceed 1.045 or 0.955.

Each boat's handicap should be posted before racing begins. Where possible, handicaps should be taken from the Table of Precalculated Classes described in Part A of this section. Where no data is available, the Race Committee should consult Part B of this section. If racing is conducted in multiple fleets, boats should be organized by similar D-PN handicaps.

Corrected times are calculated from:

$$CT = \frac{ET}{DPN \text{ or } HC} \times F$$

where F = Handicap Conversion Factor
Recommended $F = 100$
Note: F does not affect finishing order

The Race Committee should recognize that rapidly changing weather conditions during a race can upset the handicapping system. Courses for handicap races should include fairly equal amounts of beating, reaching, and running.

A. Reading Portsmouth Tables and Race Results

The Table of Precalculated Classes presents verified handicaps for several models in each of the five recognized classes— Centerboard, Sailboard, Multihull, Keelboat, and Offshore. The tables contain the Class Name, Class Code, D-PN, and HC handicaps for each documented class.

The handicaps are standardized to boats that are rigged and sailed according to class rules, in a manufacturer stock configuration, or in the standard configuration described in Section II. For classes with optional rigs, sails, and equipment, the class listing refers to a standard option. Skippers requesting special allowances must supply factory literature proving any and all deviations from the base configuration.

A coding system was developed to aid the organization of race data submitted to the Portsmouth Numbers Committee and account for these various configurations. These codes should be used when recording race results to ensure data is processed appropriately. The codes are designated as eight character alpha-numeric fields with the following guidelines:

- Classes are generally identified by two to six alpha-numeric characters
- The trailing characters are used to designate deviations from in class design and sail plan
- Certain popular class variations (Mk #, masthead rig, tall mast, shoal draft, yawl, etc.) are listed separately from the standard class option in the Tables of Precalculated Classes, usually differentiated by character #6. Letter codes for standard class variations are presented as:
 -
 - A = Gaff rig
 - B = Centerboard version of keelboat
 - C = Cat rig
 - E = Keel-centerboard version
 - F = Fin keelboat version
 - H = High or tall rig
 - K = Ketch
 - L = Keelboat version where standard is another type (i.e., shoal draft)
 - M = Masthead rig
 - N = Wing keel
 - R = Cutter
 - U = Uni-Rig
 - W = Swing or retractable keel version
 - X = Special, unique or custom design
 - Y = Yawl
- Standard adjustments are designated in characters 7 and 8 as prescribed in Table VI.

Sample code variations (See Table VI):		CLASS CODE							
Class	Variation	1	2	3	4	5	6	7	8
Fox	Cat rig	F	O	X			C		
Sunfish	One crew over 225 lbs.	S	F					3	
Sidewinder	Cat rig, 2 crew over 225 lbs.	S	W	N	D		C	3	
Morgan 28	Light engine, folding propeller, 180% genoa	M	O	R	2	8			1
Morgan 28	Heavy engine, 3 blade propeller, 155% genoa	M	O	R	2	8		8	2
Morgan 28	Mk III, heavy engine, 3 blade propeller, no spinnaker	M	O	R	2	8	3	8	*
Morgan 28	Heavy engine, 2 blade propeller, 135% genoa, tall rig	M	O	R	2	8	H	6	3
Ranger 23	Retractable outboard engine	R	N	G	2	3			
Ranger 23	¼ ton	R	N	G	1	/	4		
Ranger 23	¼ ton, Mk II	R	N	G	1	-	4		
Ranger 35	1 ton	R	N	G	1	/	1		
Ranger 36	2 ton	R	N	G	2	/	1		
San Juan 7.7		S	J	-	7	.	7		
Thistle	Single-handed, no spinnaker (hypothetical)	T	H					*	0

When referencing the Table of Precalculated Classes, Race Committees should regard handicaps bounded by parentheses with suspect as they are based on limited race data (5-15 data points). Further to this, those handicaps denoted by brackets should be taken as highly suspect as these are estimated handicaps based on less than 5 data points. Individual clubs are urged to verify and modify bracketed ratings as necessary using local race data as described in Part B of this section. Where Wind Velocity Handicap Factors are not listed, D-PN may be used. Alternatively, an HC handicap may be calculated by methods described in Part B.

B. Handicapping Unlisted Classes

Ideally, all handicaps should be verified by race data and listed in the Table of Precalculated Classes. Where unlisted classes are introduced, trial races with one or more of the Yardsticks should be conducted to determine a suitable rating in conjunction with the Portsmouth Numbers Committee. In the absence of verified race or trial data, a given boat may not have a verified D-PN handicap available. The following subparts outline two techniques to determine provisional ratings in the absence of a published handicap.

1. From Principle Dimensions and Other Ratings

The race committee may assess a provisional handicap from certain principle dimensions as follows:

- 1) Classify the boat under one of the five classes outlined in Table III
- 2) Calculate the corresponding MR, DR, or MPR
- 3) Classify the boat as one of the appropriate subclasses
- 4) Apply the corresponding D-PN formula with factors from Table IV
- 5) Apply factors in Table IV corresponding to that type to obtain HC handicaps (optional)
- 6) Apply allowance factors from Table VI to enhance D-PN or HC (optional)

The Portsmouth Numbers Committee is available to assist in the development of these provisional handicaps. Conversions of PHRF, MORC, and IOR ratings to D-PN are also available to develop provisional handicaps (see Table III – Offshore Classes).

2. From Local Race Data

While all clubs are encouraged to coordinate handicapping efforts with the Portsmouth Numbers Committee, the following simplified procedure may be used to assess DPN handicaps using local race data. Restricting the data set to only local races may be appropriate where local conditions are highly unique.

For race results to be considered, a Yardstick must be a participant in the race (see Table VII). To determine the handicap for a given boat, a series of calculations must be made. These calculations are repeated for each individual race or trial and then aggregated in a weighted average to obtain an estimated D-PN. A table is presented to aid the organization of race data and facilitate these calculations.

- 1) Where multiple Yardsticks participated, an average D-PN or HC should be calculated for the given Beaufort Number (BN) observed in that race. Where the BN is unknown, D-PN values for the Yardsticks should be used and the BN denoted as “X”.

$$HC_{avg,BN} = \frac{\sum_{i=1}^n HC_{i,BN}}{n}$$

- 2) The corrected average Elapsed Time of the Yardsticks in that race is given by:

$$ET_{avg,BN} = HC_{avg,BN} \times \frac{\sum_{i=1}^n \left(\frac{ET_i}{HC_{i,BN}} \right)}{n}$$

- 3) ET_{avg} and $HC_{avg,BN}$ of the Yardsticks may then be used to assess the handicap for the other boat in the race, denoted by subscript j . By definition, the following handicapping equation is taken:

$$\frac{ET_1}{HC_1} \times F = \frac{ET_2}{HC_2} \times F$$

Therefore

$$HC_{j,BN} = \frac{(ET_{j,BN})(HC_{avg,BN})}{ET_{avg}}$$

This will yield a series of $HC_{j,BN}$ values, one for each race conducted.

- 4) The resulting $HC_{j,BN}$ for each BN should be averaged together, thus consolidating the list to one value for each BN available.

$$HC_{j,avg,BN} = \frac{\sum_{j=1}^n HC_{j,BN}}{n}$$

- 5) The general purpose D-PN may finally be calculated as an average of these results weighted by the wind condition. Weight Factors (WF) are outlined in Table II.

$$DPN_j = \frac{\sum_{BN=0}^X (HC_{j,avg,BN})(WF_{BN})}{\sum_{BN=0}^X (WF_{BN})}$$

	Race 1 BN=		Race 2 BN=		Race 3 BN=		Race 4 BN=		Race 5 BN=	
	HC _{i,BN}	ET _{i,BN}	HC _{i,BN}	ET _{i,BN}	HC _{i,BN}	ET _{i,BN}	HC _{i,BN}	ET _{i,BN}	HC _{i,BN}	ET _{i,BN}
Yardstick 1										
Yardstick 2										
Yardstick 3										
	1) HC _{avg,BN}	2) ET _{avg,BN}	1) HC _{avg,BN}	2) ET _{avg,BN}	1) HC _{avg,BN}	2) ET _{avg,BN}	1) HC _{avg,BN}	2) ET _{avg,BN}	1) HC _{avg,BN}	2) ET _{avg,BN}
Trial Boat	3) ET _{j,BN} =		3) ET _{j,BN} =		3) ET _{j,BN} =		3) ET _{j,BN} =		3) ET _{j,BN} =	
$HC_{j,BN} = \frac{(ET_{j,BN})(HC_{avg,BN})}{ET_{avg}}$										

BN	Mono/Multi-Hull WF _{BN} (Table II)	4) HC _{j,avg,BN}	(HC _{j,avg,BN})(WF _{BN})
0	0.33/0.33		
1	0.61/0.61		
2	0.88/0.75		
3	1.00/0.88		
4	0.88/1.00		
5	0.61/0.88		
6	0.33/0.61		
7	0.14/0.33		
8	0.04/0.14		
9	0.01/0.04		
X	0.28/0.28		
$5) DPN_j = \frac{\sum_{BN=0}^X (HC_{j,avg,BN})(WF_{BN})}{\sum_{BN=0}^X (WF_{BN})}$			

VI. Data Reporting

We are indebted to clubs and fleets who have supplied race results to the Portsmouth Numbers Committee for the furtherance of the system. This service would not be possible without your participation and support.

All groups, regardless of size, are encouraged to coordinate score sheet submissions with their Race Committee. All results should include:

- 1) Club or fleet name plus sender's address, phone and email
- 2) List of participants and classes using coding system outlined in Section III.B or, in the case of an unlisted class, a detailed description.
- 3) Record of wind velocity at the start, middle and finish of races
- 4) Record of elapsed and corrected times, preferably in decimal minutes
- 5) Results should be submitted to PORTSMOUTH@USSAILING.ORG by November 1 for inclusion in the next edition of the Yardstick Tables

Scoring templates are available from USSAILING.ORG for Race Committee use. Results may also be submitted in Microsoft Excel, Word, or Sailwave html format. A scanned copy of the scoring sheet would be well received.

Thank you!

Table I: Beaufort Scale

Beaufort Number	Wind Speed (kts)	Seaman's Term	Sea Condition	Typical Wave Height (ft)	Typical Condition Attainment Time
0	0-1	Calm	Glassy-smooth, mirror-like	Smooth	-
1	2-3	Light Air	Scale-like ripples	Ripples	1-10 min
2	4-6	Light Breeze	Small, short wavelets with glassy crests	1/3	5-15 min
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, occasional foam	1-2	5-20 min
4	11-16	Moderate Breeze	Small waves, some whitecaps, more frequent foam	2-3	15-60 min
5	17-21	Fresh Breeze	Moderate longer waves, better formed, many whitecaps, much foam, some spray	3-4	15-60 min
6	22-27	Strong Breeze	Large waves form, many whitecaps, foam everywhere, more spray	4-5	¼-2 hr
7	28-33	Moderate Gale	Sea heaps up, streaks of foam, spindrift begins	5-6	½-3 hr
8	34-40	Fresh Gale	Moderately high, long waves, crests into spindrift, well-marked streaks of foam	6-7	½-3 hr
9	41-47	Strong Gale	High waves, sea rolls, dense streaks, spray affects visibility	7-9	½-4 hr

Table II: D-PN Assessment Weight Factors

Beaufort Number	Weight Factor (except Multihulls)	Weight Factor Multihulls
BN	WF	WF
0	0.33	0.33
1	0.61	0.61
2	0.88	0.75
3	1.00	0.88
4	0.88	1.00
5	0.61	0.88
6	0.33	0.61
7	0.14	0.33
8	0.04	0.14
9	0.01	0.04
X (Unknown BN)	0.28	0.28

Table III: Class Types and Rating Formulae

Common Abbreviations and Formulae

<i>A, B = Regression Coefficients</i> <i>LOA = Length Overall (ft)</i> <i>LWL = Waterline Length (ft)</i> <i>SA = Sail Area (ft²)</i>	<i>c = Number of Crew</i> <i>D = Displacement, class weight (lbs)</i> <i>Power – Displacement Ratio = $\sqrt{SA}/\sqrt[3]{D}$</i>
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A. CENTERBOARD CLASSES

- I. Possibly more wetted surface and/or medium power-displacement ratio relative to Thistle (DAY SAILER, LONE STAR 16)
- II. Possibly more wetted surface and/or lower power-displacement ratio relative to Thistle (ALBACORE, FLYING SCOT, LIGHTNING, MOBJACK)
- III. Possibly similar wetted surface and/or equivalent power-displacement ratio relative to Thistle (CLARK, CORONADO 15, FJ, HIGHLANDER, KESTREL, RAVEN, SNIPE, WINDMILL)
- IV. Possibly less wetted surface and/or similar power-displacement ratio relative to Thistle (INTERNATIONAL 14, BLUE JAY, DEMON, JET 14)
- V. Trapeze classes (INTERNATIONAL 470, INTERNATIONAL 505, FIREBALL, FLYING DUTCHMAN, JOLLYBOAT)
- VI. Scow Classes (C-SCOW, E-SCOW, M-SCOW, MC-SCOW, Y-FLYER)
- VII. Lateen-rig, board boat classes (MINIFISH, SAILFISH, SCORPION, SUNFISH)
- VIII. Cat-rig, high-performance, single-handers; possibly more wetted surface and/or equivalent power-displacement ratio relative to Thistle (FINN, FORCE 5, LASER, OK DINGHY)
- IX. Cat-rig, medium and low performance, single handers; possibly less wetted surface and/or equivalent power-displacement ratio relative to Thistle (KITE, MOTH, OPTIMIST, PENGUIN, PRAM)

Measured Rating (MR) Centerboard Classes

$MR = \frac{1}{2} \left[\frac{LOA + LWL}{2} + \sqrt[1.3]{SA} \right]$
$D - PN = A + [B(MR)] \quad (\text{See Table IV})$

B. MULTIHULL CLASSES

Modified Pacific Multihull Association Rating (PMR)

$PMR = 0.7071(z) \sqrt{1 + \sqrt{1 + \frac{535.2(w)}{z^2 L^4}}}$
$w = 1.1D + 175c$ $L = 0.6(LWL) + 0.4(LOA)$ $z = \sqrt[4]{\frac{(w)(L)^4}{(SA)^2}}$
$D - PN = A + [B(PMR)] \quad (\text{See Table IV})$

C. KEELBOAT CLASSES

- I. Possibly more wetted surface and/or equivalent power-displacement ratio relative to Thistle (COLUMBIA 21 DRAGON, LUDERS 21, SOLING, STAR)
- II. Possibly more wetted surface and/or lower power-displacement ratio relative to Thistle (INTERNATIONAL 110, LUDERS 16, RHODES 19)
- III. Possibly similar wetted surface and/or similar power-displacement ratio relative to Thistle (SIMILAR TO D. OFFSHORE CLASSES – TYPE III)
- IV. Light displacement hulls capable of surfing or planning (TEMPEST)
- V. Centerboard versions of keelboats (RHODES 19 CB, COLUMBIA 21 CB)

Derived Rating (DR) for Keelboat Classes

$$DR = 0.991(LWL) \sqrt{\frac{SA}{\sqrt[3]{D}}}$$

$$D - PN = A + [B(DR)] \quad (\text{See Table IV})$$

D. OFFSHORE CLASSES

- I. Power-displacement ratio less than 1.000 and LOA greater than 28.0 ft (CAL 30, COLUMBIA 50, ERICSON 29, MORGAN 30)
- II. Power-displacement ratio less than 1.070 (CAL 29 ELECTRA, ERICSON 25, TYPHOON)
- III. Power-displacement ratio greater than 1.070 but less than 1.200 (BALBOA 26, C&C 35, SANTANA 21)
- IV. Power-displacement ratio less than 1.000 and LOA less than 28.0 ft
- V. Ultra-Light Displacement Boat (ULDB)

Derived Rating (DR) for Offshore Classes

$DR = 0.991(LWL) \sqrt{\frac{SA}{\sqrt[3]{D}}}$
$D - PN = A + [B(DN)] \quad (\text{See Table IV})$

Provisional Rating Conversions for Offshore Classes

$D - PN = A + [B(IOR)] \quad (\text{See Table IV})$
$D - PN = A + [B(MORC)] \quad (\text{See Table IV})$
$D - PN = \frac{PHRF}{6} + 55$

Table IV: D-PN Coefficients and HC Factors

CLASS	TYPE	RATING	D-PN Formulae Constants		HC Factors HC=(f)(D-PN) Beaufort Scale				
			A	B	0-1	2-3	4	5-9	
Centerboard Classes	I	MR	143.9	-2.758	1.060	1.010	0.970	0.970	
	II	MR	96.0	-0.308	1.071	1.008	0.941	0.941	
	III	MR	113.4	-1.392	1.023	1.004	0.973	0.973	
	IV	MR	213.1	-8.227	1.010	0.978	0.974	0.974	
	V	MR	113.1	-1.790	1.026	1.016	0.967	0.967	
	VI	MR	117.6	-1.780	1.055	1.026	0.975	0.975	
	VII	MR	205.5	-7.940	1.014	1.001	0.935	0.935	
	VIII	MR	109.1	-1.160	1.012	1.010	0.990	0.990	
	IX	MR	209.8	-9.231	1.009	0.991	0.985	0.985	
Multihull Classes		PMR	14.3	58.74	1.070	1.030	1.000	0.950	
Keelboat Classes	I	DR	106.4	-0.952	1.017	1.008	0.984	0.984	
	II	DR	110.9	-0.602	1.041	1.021	0.944	0.944	
	III	DR	141.0	-2.620	1.017	1.008	0.971	0.971	
	IV	DR	124.6	-1.014	1.018	0.986	0.980	0.980	
	V	DR	105.5	-0.960	1.048	1.016	0.908	0.908	
Offshore Classes	I	DR	114.7	-1.183	1.027	1.023	0.960	0.940	
		IOR	110.1	-0.861					
		MORC	—	—					
		PHRF	See Table V						
		II	DR	138.1	-2.167	1.008	1.006	.990	.985
		IOR	136.1	-2.190					
		MORC	116.5	-0.993					
		PHRF	See Table V						
		III	DR	155.1	-2.615	1.017	1.008	0.980	0.971
		IOR	109.1	-0.977					
	MORC	129.1	-1.493						
	PHRF	See Table V							
	IV	DR	N/A	N/A	1.017	1.008	0.992	0.990	
	V	DR	N/A	N/A	1.007	1.002	0.992	0.990	

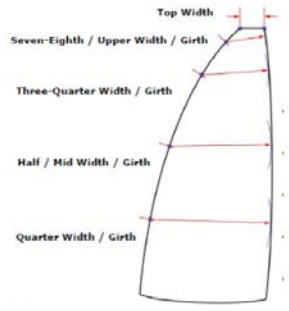
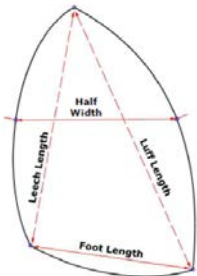
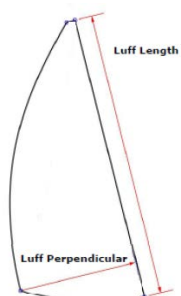
Table V: Relationship of DPN to PHRF

D-PN	PHRF	D-PN	PHRF	D-PN	PHRF
54.5	-3	73	108	91.5	219
55	0	73.5	111	92	222
55.5	3	74	114	92.5	225
56	6	74.5	117	93	228
56.5	9	75	120	93.5	231
57	12	75.5	123	94	234
57.5	15	76	126	94.5	237
58	18	76.5	129	95	240
58.5	21	77	132	95.5	243
59	24	77.5	135	96	246
59.5	27	78	138	96.5	249
60	30	78.5	141	97	252
60.5	33	79	144	97.5	255
61	36	79.5	147	98	258
61.5	39	80	150	98.5	261
62	42	80.5	153	99	264
62.5	45	81	156	99.5	267
63	48	81.5	159	100	270
63.5	51	82	162	100.5	273
64	54	82.5	165	101	276
64.5	57	83	168	101.5	279
65	60	83.5	171	102	282
65.5	63	84	174	102.5	285
66	66	84.5	177	103	288
66.5	69	85	180	103.5	291
67	72	85.5	183	104	294
67.5	75	86	186	104.5	297
68	78	86.5	189	105	300
68.5	81	87	192	105.5	303
69	84	87.5	195	106	306
69.5	87	88	198	106.5	309
70	90	88.5	201	107	312
70.5	93	89	204	107.5	315
71	96	89.5	207	108	318
71.5	99	90	210	108.5	321
72	102	90.5	213	109	324
72.5	105	91	216		

Table VI: Standard Modification Factors

All pre-calculated handicaps assume boats are equipped in accordance with class rules. Each competitor shall declare ALL non-class approved equipment, including sails, and conform to crew weight and complement standards. Any deviations from standard class configurations beyond those listed below can be assessed a penalty of at least 0.995 at the discretion of the Race Committee. Adjustments may be compounded where multiple modifications exist, though it is recommended that no more than two allowances be made and that combined allowances or penalties not exceed 1.045 or 0.955.

$$D - PN_{mod} = (D - PN)(MF)$$

SAIL DEFINITIONS	
<i>Same Sail Area:</i>	< 5% of calculated sail area
<i>Greater/Smaller Sail Area:</i>	≥ 5% difference in calculated sail area
<i>Small jibbed boats:</i>	Boats with standard jib tacked to bridal wires and hoisted to or below mast hounds
<i>Large jibbed boats:</i>	Boats with foils or jibs with tack attached to the deck or from cross beam and/or head attached above mast hounds
<i>Mainsail Area</i>	$A_{main} = \frac{Luff}{8} * (2 * Foot + 3 * MHW + 1.5 * MTW + MUW + .5 * MHB)$ 
<i>Spinnaker Area</i>	$A_{SPN} = \frac{(SLU + SLE)(SFL + 4 * SHW)}{12}$ 
<i>Headsail Area</i>	$A_{jib} = HLP(.5 * HLU)$ 

Select Multihull Class Crew and Weight Limits						
NL	Not listed in class rules			50+	If more than 50 lbs. are needed to make minimum weight, an additional crew person shall be carried	
~	SuperCat class rules state that in open class racing the number of persons on board may be increased or decreased.			R	Refer to Tornado Class Rules for a full explanation of minimum and correction weights.	
	Min. Crew Weight	Min. Num. Crew	Min. Boat Weight	Max. Added Weight	Source	Notes
ARC 22 Carbon I	325	2	415	40	1/1/00 Class Rules	Alum. beams and mast
ARC 22 Carbon II	325	2	405	40	1/1/00 Class Rules	Alum. beams, carbon mast
ARC 22 Carbon III	325	2	390	40	1/1/00 Class Rules	Carbon beams and mast
BIM 16	143	None	None	None	1/1/01 Class Rules	
BIM 16 Sport	143	None	None	None	1/1/01 Class Rules	
Hobie Wave	NL	NL	NL	NL	97-00 IHCA Class Rules	
Hobie 14	None	NL	240	50+	97-00 IHCA Class Rules	
Hobie 14 Turbo	150	NL	240	50+	97-00 IHCA Class Rules	
Hobie 16 Men	285	NL	320	50+	97-00 IHCA Class Rules	
Hobie 16 Women	260	NL	320	50+	97-00 IHCA Class Rules	In womens class racing (non-open)
Hobie 17	160	NL	330	50+	97-00 IHCA Class Rules	
Hobie 17 Sport	NL	NL	NL	NL	97-00 IHCA Class Rules	
Hobie 18 Men	295	NL	400	50+	97-00 IHCA Class Rules	
Hobie 18 Women	260	NL	400	50+	97-00 IHCA Class Rules	In womens class racing (non-open)
Hobie 18 M	295	NL	400	50+	97-00 IHCA Class Rules	
Hobie 18 SX	310	NL	455	50+	97-00 IHCA Class Rules	455 is without spinnaker gear
Hobie 18 Form	295	NL	400	50+	97-00 IHCA Class Rules	
Hobie Tiger 18	308	NL	396	50+	97-00 IHCA Class Rules	Min. boat weight w/o spn380
Hobie 20	295	NL	420	50+	97-00 IHCA Class Rules	
Hobie Fox	332	NL	419	50+	3/01 NAHCA Website	
Hobie 21	330	NL	565	50+	97-00 IHCA Class Rules	Platform420:mast/boom100:wings45
Inter 17	145	1	None	20+1/2	NAICA 9/00 Class Rules	Minimum live weight 120lbs
Inter 17R	165	1	None	25+1/2	NAICA 9/00 Class Rules	Minimum live weight 130lbs
Inter 18	280	2	None	20+1/2	NAICA 9/00 Class Rules	Minimum live weight 250lbs
Inter 20	325	2	None	25+1/2	NAICA 9/00 Class Rules	Minimum live weight 275lbs
Isotope	145	NL	275	NL	US Isotope Class Rules	
Mystere 3.5	None	None	None	None	3/94 Class Rules	
Mystere 5.0	260	2	None	50	3/94 Class Rules	
Mystere 5.0 XL	260	2	None	50	3/94 Class Rules	
Mystere 5.5	280	2	None	50	3/94 Class Rules	
Mystere 5.5 Fun	280	2	None	50	3/94 Class Rules	
Mystere 6.0	315	2	None	50	3/94 Class Rules	
Mystere 6.0 XL	315	2	None	50	3/94 Class Rules	
Nacra 4.5/450 SL	220	2	None	30	12/1/98 Class Rules	
Nacra 4.5 Uni	130	1	None	30	12/1/98 Class Rules	
Nacra 5.0/500	260	2	None	30	12/1/98 Class Rules	
Nacra 5.2	280	2	None	40	12/1/98 Class Rules	
Nacra 5.5 SL	275	2	None	40	12/1/98 Class Rules	5.5 SL without jib is a legal 5.5 Uni
Nacra 5.5 Uni	150	1	None	20	12/1/98 Class Rules	
Nacra 5.7/570	290	2	None	40	12/1/98 Class Rules	
Nacra 5.8/5.8 NA	290	2	420	50	12/1/98 Class Rules	
Nacra 6.0 NA	325	2	None	65	12/1/98 Class Rules	
Prindle 15	150	1	260	50	4/1/99 Class Rules	
Prindle 16	260	2	300	50	4/1/99 Class Rules	
Prindle 18	300	2	335	50	4/1/99 Class Rules	
Prindle 18-2	275	2	375	50	4/1/99 Class Rules	
Prindle 19	295	2	385	50	4/1/99 Class Rules	
Prindle 19MX	295	2	385	50	4/1/99 Class Rules	
Prindle 20	NL	NL	NL	NL	4/1/99 Class Rules	
SuperCat 15 Single	150	1~	295	30	1/85 Class Rules	
SuperCat 15 Double	260	2~	295	30	1/85 Class Rules	
SuperCat 17	280	2~	325	50	1/85 Class Rules	
SuperCat 17 XL	NL	NL	NL	NL	1/85 Class Rules	
SuperCat 19	290	2~	375	50	1/85 Class Rules	
SuperCat 19 XL	NL	NL	NL	NL	1/85 Class Rules	
SuperCat 20	300	2~	450	60	1/85 Class Rules	
SuperCat 20 Tall	300	2~	465	60	1/85 Class Rules	
SuperCat 22	NL	NL	NL	NL	1/85 Class Rules	
Taipan 4.9 Uni	None	1	97kg	None	1/12/99 Class Rules	Uni class legal with skipper only
Taipan 4.9 SL	None	2	102kg	None	1/12/99 Class Rules	
Taipan 5.7	None	2	142kg	None	1/12/99 Class Rules	137kg without spinnaker
Tornado	None	2	R	R	Tornado Class Rules	

Multihull Specific Adjustments						
	Description	DPN	MF for Beaufort Range			
			0-1	2-3	4	5-9
GN	Class normally without genoa or reacher, carrying one	0.972	0.965	0.970	0.972	0.972
JL	Class normally without jib, carrying <i>large jib</i>	0.941	0.940	0.933	0.929	0.938
JS	Class normally without jib, carrying <i>small jib</i>	0.975	0.965	0.971	0.975	0.975
JU	For larger than standard jib	0.995	0.984	0.990	0.995	1.000
UL	Class normally with <i>large jib</i> , sailing UNA without jib	1.076	1.075	1.083	1.076	1.060
US	Class normally with <i>small jib</i> , sailing UNA without jib	1.026	1.036	1.030	1.026	1.026
SD	Class normally without spinnaker, carrying one in long distance race	0.955	0.965	0.960	0.955	0.955
SG ¹	Class normally without spinnaker/reacher, carrying spinnaker AND genoa/reacher	0.958	0.948	0.955	0.958	0.958
SN ¹	Class normally with spinnaker, genoa, reacher, hooter or wire/rope luff headsail attached to a pole, not equipped with one	1.020	1.036	1.025	1.020	1.010
SP ¹	Class normally without spinnaker, genoa, reacher, hooter or wire/rope luff headsail attached to a pole, carrying one or more	0.960	0.953	0.958	0.960	0.960
ML ²	For non-class mainsail of <i>greater area</i> than class standard	0.980	0.969	0.975	0.980	0.985
MN ²	For non-class mainsail of <i>same or smaller area</i> than class standard	0.995	0.990	0.990	0.995	0.995
MT	For taller mast than standard	0.995	0.990	0.990	0.995	0.995
BM	For wider than standard beam	0.995	1.005	1.000	0.990	0.984
TR	For carrying trapezes above class allowance, per trapeze	0.981	1.000	0.988	0.981	0.963
L1	Total crew 90-100% class min. wt.	0.991	0.990	0.991	0.996	0.999
L2	Total crew 80-90% class min. wt.	0.983	0.980	0.983	0.991	0.997
L3	Total crew 70-80% class min. wt.	0.974	0.970	0.974	0.987	0.996
L4	Total crew < 70% of class min. wt. OR for single-handing a sloop not having class min. crew weights	0.970	0.965	0.970	0.985	0.995
H1	Total crew 110-120% class min. wt.	1.003	1.010	1.007	1.003	1.000
H2	Total crew 120-130% class min. wt.	1.006	1.020	1.013	1.006	1.000
H3	Total crew > 130% class min. wt.	1.010	1.030	1.020	1.010	1.000

General Adjustments						
		MF for Beaufort Range				
Spinnaker Adjustments ¹	Description	DPN	0-1	2-3	4	5-9
S	Class normally without spinnaker, carrying one	0.972	0.986	0.979	0.972	0.986
A	Use of asymmetrical spinnaker (except where designed as standard)	0.995	0.995	0.995	0.995	0.995
R ³	Addition of non-class sprit and asymmetrical spinnaker ¹	0.965	0.934	0.949	0.955	0.955
For each 5% length of spinnaker or whisker pole beyond J or class rules, deduct 0.5 from the D-PN or HC. No adjustment provided for spinnaker or whisker poles shorter than J.						
Crew Complement and Equipment Adjustments ⁴						
T	Class carrying trapeze in excess of class rule	0.981	1.000	0.988	0.981	0.963
0	Under-crewed vessel	1.010	0.985	1.000	1.010	1.013
1	Solo sailing 2-person sloop under full sail	0.970	0.965	0.970	0.985	1.000
2	Solo sailing 2-person sloop under mainsail only, no jib	1.020	1.010	1.015	1.020	1.025
3	Single-Handed class, total crew weight greater than 225 lbs (single or extra crew)	1.020	1.010	1.015	1.020	1.025
4	2 person class, total crew weight >400 lbs. or 3 person class, total crew weight >575 lbs.	1.009	1.025	1.019	1.001	0.995
5	Outboard in water on both tacks OR non-standard, non-retractable engine < 500 lbs with solid, 2-blade, out of aperture propeller	1.021	1.024	1.020	1.014	1.000
6	non-standard engine > 500 lbs with solid, 2-blade, out of aperture propeller	1.025	1.028	1.023	1.018	1.000
7	Non-standard, non-retractable engine < 500 lbs with solid, 3-blade, out of aperture propeller	1.025	1.030	1.023	1.018	1.004
8	Non-standard, engine > 500 lbs with solid, 3-blade, out of aperture propeller	1.029	1.034	1.028	1.022	1.004
9	Other deviations from standard class or design configurations can be assessed a penalty of at least 0.995. Multiple deviations may incur multiple penalties.					
Headsail Adjustments ⁵						
*	Class normally with spinnaker, not equipped	1.010	1.008	1.010	1.000	1.000
G	Unknown genoa size (CB, MH classes)	0.985	0.974	0.980	0.995	0.990
J	Class normally without jib, carrying one	0.975	(2)	(2)	(2)	(2)
11	Largest genoa HLP < 110%	1.029	1.041	1.029	1.010	1.000
12	Largest genoa HLP > 155%	0.993	0.987	0.990	0.995	0.998
13	Largest genoa HLP 150 – 155%	1.000	1.000	1.000	1.000	0.993
14	Largest genoa HLP 131 – 149%	1.000	1.005	1.000	1.000	0.995
15	Largest genoa HLP 110 – 130%	1.009	1.018	1.009	1.000	1.000
	For a furling headsail added in place of conventional headsail, add 1.0 to DPN or HC.	+1.000	+1.000	+1.000	+1.000	+1.000

¹Modification factor applied for each spinnaker carried above stock/class limit standard. Spinnaker modifications are not appropriate for short races (i.e., less than 30 minutes).

²Length and number of battens shall conform to class rules or, where such rules do not exist on offshore classes, full length battens shall be allowed.

³Asymmetrical spinnakers in place of conventional spinnakers are permitted provided they are tacked on centerline either to the deck or to a sprit, if permitted by class rules, but not to a conventional spinnaker pole

⁴Owner should supply manufacturer's literature to support request for engine allowance. Published ratings reflect the boat's performance with stock equipment.

⁵Reefing of genoas is NOT allowed if a modification allowance is used

Table VII: Primary and Secondary Yardsticks

CENTERBOARD CLASSES	Code	Handicaps (HC) by Beaufort Number								Weight Factor
		D-PN	0	1	2	3	4	5	6	
Thistle*	TH	83	83	83	83	83	83	83	83	10
420 (Int.)	420	98.2	104	103	101	99	95	92	89	6
470 (Int)	470	86.6	91	91	90	88	85	82	80	9
505 (Int)	505	80.2	82	82	81	80	79	78	77	8
Albacore (15')	ALBA	90.9	95	95	94	93	89	86	84	7
Bandit 15	BND15	98.3	100	100	99	98	97	96	95	4
Blue Jay	BJ	108.7	111	110	110	109	108	107	105	4
Buccaneer 18 (Southwind 18)	BCN	87.4	89	89	88	87	86	86	85	7
Butterfly	BUT	108.5	110	111	110	109	108	106	105	6
C Scow	C-SC	79.4	82	81	81	80	78	77	76	7
CL 16	CL-16	96.3	98	98	98	97	96	94	92	5
Coronado 15	COR15	91.8	93	92	92	92	91	90	89	7
Day Sailer (O'Day 17)	DS	99.9	103	103	102	100	98	97	96	8
Dolphin Sr	DLPSR	106.2	111	112	111	108	101	98	97	6
E Scow	E-SC	73.2	78	78	76	74	72	70	65	6
Enterprise (Int.)	ENT	92.8	93	94	94	93	92	91	90	7
Finn (Int.)	FN	90.5	94	93	92	91	89	87	85	7
Fireball (Int.)	FB	86	88	88	88	87	86	83	79	8
FJ (Int.)	FJ	98.3	102	101	100	99	97	95	93	6
Flying Dutchman (Int.)	FD	80.2	82	83	82	81	79	76	73	7
Flving Scot (19')	FSCT	90.4	92	92	92	91	90	88	87	8
Force 5	F5	96.3	98	98	97	96	95	94	93	7
G.P. 14	GP-14	101.1	103	102	102	102	100	100	98	4
Harpoon 5.2	HPN5.2	95.6	99	99	98	97	96	94	92	5
Highlander	11-Jan	84.6	88	88	87	86	83	80	77	7
Interlake	INT	89.7	94	92	91	90	89	85	84	6
Jet 14	JT14	97.5	97	98	99	98	97	95	93	6
Kestrel	KL	91.6	91	91	92	92	92	92	91	7
Laser (Int.)	LASE	91.2	94	93	92	92	91	89	86	9
Laser II (Int., WIrap & Spin)	LASE-2	93.4	95	96	95	94	93	90	87	7
Lido 14	LD14	99.5	100	100	100	100	99	98	98	6
Lightning (Int.)	LI	88	95	92	89	87	85	84	83	9
M Scow (M-16 Scow)	M-SC	89.8	96	95	92	90	88	86	84	8
M-20 Scow	M-20	84.1	89	88	86	84	82	81	80	6
MC Scow	MC-SC	89.4	91	90	89	89	89	88	88	7
Mobjack	MJ	91.9	98	95	94	93	88	86	86	5
Mutineer 15' (Southwind 15)	MUTR	96.1	98	98	97	96	95	94	94	6
Rebel	REB	96.9	96	96	96	96	97	98	98	6
Rhodes Bantam	RB	97.5	101	100	99	98	96	94	92	5
Sidewinder (Sloop)	SWND	99.1	103	102	101	100	98	95	93	5
Skipjack	SJ	93.1	94	95	95	94	92	89	87	4
Snipe (Int.)	SN	92.8	96	95	94	93	92	90	85	8
Sunfish (Glass DB, Race Sail)	SF-2	99	104	104	103	100	97	95	92	2
Sunfish (Recreation Rigged)	SF	102.8	107	107	106	105	102	98	94	9
Sweet Sixteen	SWSX	95.9	101	98	96	95	94	94	94	4
Tasar	TASA	89.8	92	94	92	90	88	87	86	6
Tornado C/B	TOCB	91	91	92	92	92	92	90	88	5
US-1	US-1	91.5	90	91	92	92	92	92	91	5
Wayfarer	WF	91.8	94	93	92	91	90	90	90	7
Windmill	WM	89.7	93	93	92	91	89	87	82	7
Y-Flyer	YF	88	90	90	90	89	87	84	83	8

KEELBOAT CLASSES			Handicaps (HC) by Beaufort Number							Weight Factor
	Code	D-PN	0	1	2	3	4	5	6	
Rhodes 19 (CB Ver.)	RDS19B	95.8	100	100	98	96	94	92	90	4
Soling (Int., Class Jib)	SO	82.5	86	85	84	83	82	80	78	7
Star (Int.)	ST	83.2	84	84	84	84	83	82	81	5
Victory 21 w/Genoa, no Spin	VIC21	98.6	100	100	99	99	98	98	97	5

MULTIHULL CLASSES			Handicaps (HC) by Beaufort Number							Weight Factor
	Code	D-PN	0	1	2	3	4	5	6	
F-27 Tri (Main & Jib)	F-27	75	77	77	76	74	73	68	65	3
Hobie 14 1-Up	HOB14	86	97	95	92	89	85	81	79	9
Hobie 14 Turbo 1-Up	HOB142	83	85	87	86	84	82	81	80	5
Hobie 16	HOB16	77	85	83	81	79	74	71	70	8
Hobie 17 1-Up	HOW 7	74	78	79	78	76	74	72	71	6
Hobie 18 & 18 Magnum	HOB18	71.5	77	76	74	72	70	68	66	8
Hobie 20 Miracle	HMO	65.5	70	69	67	66	65	63	58	4
Hobie 21	HOB21	66.5	75	73	71	69	66	63	62	4
Nacra 5.0 2-Up	N5.0	76	82	81	80	78	76	74	71	4
Nacra 5.2 2-Up	N5.2	72	78	78	76	73	71	68	67	8
Nacra 5.5 8.5' Sloop	N5.5	67.5	75	74	71	68	65	62	59	6
Nacra 5.7 2-Up	N5.7	71.5	81	80	79	77	73	67	63	3
Nacra 5.8 2-Up	N5.8	66.5	72	72	71	68	65	62	59	7
Nacra 5.8 North American	N5.8NA	66	72	72	70	68	66	64	62	2
Nacra 6.0 North American	N6.0NA	66	65	65	65	63	62	61	60	3
Prindle 15	PRN15	78	80	80	79	78	76	73	69	6
Prindle 16	PRN16	77.5	86	85	83	80	77	72	69	7
Prindle 18	PRN18	75	84	84	81	78	75	72	72	7
Prindle 18-2	PRN182	68.5	72	73	73	72	69	66	64	5
Prindle 19	PRN19	66.5	72	71	70	67	64	63	59	8
Sea Spray 15 (Sea Moth)	SPY15	79	88	85	82	80	76	71	69	5
Shark	SK	75	78	79	78	77	73	69	65	6
Tornado (Int.)	TORN	64	70	69	67	65	64	62	59	7

OFFSHORE CLASSES	Handicaps (HC) by Beaufort Number									Weight Factor
	Code	D-PN	0	1	2	3	4	5	6	
Aquarius 23	AQU23	104.2	106	105	104	103	102	102	102	5
Balboa 20	BLB20	104.1	106	106	105	104	104	103	103	7
Balboa 26	BLB26	93.7	96	95	94	93	92	91	91	5
Beneteau 23.5 (DKNVK)	BNT235	89.2	91	90	90	89	89	88	88	5
C&C 24	C/C24	91.6	97	96	94	93	92	92	91	4
Cal 20	CAL20	99.2	100	101	101	100	98	96	94	7
Cal 21	CAL21	98.3	100	100	99	98	98	97	97	7
Cal 25	CAL25	91.3	91	92	93	92	91	90	88	8
Cal 27	CAL27	90	94	93	92	91	89	87	85	4
Cal 29 & 2-29	CAL29	83.8	85	85	84	84	83	82	81	6
Capri 22 (FK/SKNVK)	CAP22	91.8	93	94	93	92	92	92	92	5
Capri 25	CAP25	85.1	86	85	86	86	85	84	83	8
Catalina 22 (SKNVK, no Spin)	CAT22	97.3	99	98	98	97	96	95	95	9
Catalina 25 (FK/SKNVK)	CAT25	94.3	96	96	96	95	94	93	92	8
Catalina 25 (FK/SK, Tall Mast)	CAT25H	91.7	91	92	91	90	89	88	87	5
Catalina 27 & 270 (FKNVK)	CAT27	87.5	91	90	89	88	86	85	84	9
Catalina 30 (FK)	CAT30	86.3	89	89	88	87	86	83	80	6
Challenger 24 (Col.)	CHL24	96.9	97	97	98	98	96	95	93	6
Chrysler 22 (Swing Keel)	CRL22	100.7	104	103	102	101	100	98	96	6
Clipper 21	CLP21	108.3	115	114	112	110	107	101	96	3
Columbia 26 Mk 2	COL262	90.3	91	91	91	91	91	90	88	7
Coronado 23	COR23	102.5	105	105	103	101	100	99	98	4
Coronado 27	COR27	95.1	97	96	96	95	94	93	91	3
Ensign	EN	96	99	98	98	97	96	93	90	7
Ericson 25	ERC25	96.3	96	97	97	97	96	96	95	5
Ericson 27	ERC27	94.7	96	96	96	95	93	92	91	3
Ericson 29	ERC29	87.3	87	89	88	87	85	84	75	3
Express 27	EXS27	78.6	80	80	81	80	78	77	75	3
Helms 24	HLM24	94	98	96	95	93	92	91	90	4
Hobie 33	HOB33	72.3	73	73	73	72	71	70	69	4
Holder 20	HLR20	85.7	89	88	87	86	85	82	79	6
Hunter 22 (Swing Keel)	HTR22	97.7	97	97	97	96	96	95	94	3
Hunter 23 (Wing Keel)	HTR23	96.1	100	99	98	97	95	94	93	4
Hunter 25 (Deep Keel)	HTR25	92.9	93	93	93	92	92	91	91	3
Hunter 25.5	HTR255	90.8	94	93	93	92	90	86	85	4
Hunter 28.5	HTR285	85	86	86	86	85	84	83	83	4
Hunter 31 (Shoal Draft)	HTR31	85.4	86	87	86	86	85	84	83	4
Irwin 23	IRVV23	96.9	99	98	98	97	96	95	95	4
J122 (Class Jib)	J-22	82.7	85	84	83	82	82	82	81	5
J/24 (Int)	J-24	81.1	83	83	82	81	80	79	77	9
J/30	J-30	77	79	78	78	77	76	74	73	5
Kittiwake 23	KTW23	100.6	101	102	102	101	100	98	97	4
MacGregor 25 (DB)	MCG25	96.5	100	99	98	97	95	93	92	6
MacGregor 26	MCG26	92.4	96	95	94	93	92	91	90	5
Merit 22 (Retr. Keel)	MRT22	93.8	95	94	93	93	93	93	93	6
Merit 23 (Wing Keel)	MRT23	88.8	91	91	90	90	89	89	88	4
Merit 25	MRT25	83.4	84	84	84	84	83	82	80	8
Moore 24	MRE24	82.2	85	84	82	81	80	79	79	4
Morgan 22	MOR22	97.8	103	101	100	98	96	94	90	4
Morgan 24 & 25	MOR25	91.5	94	93	92	91	91	90	90	6

Morgan 27	MOR27	81.8	83	83	83	82	82	81	79	6
O'Day 23 (Keel Step)	ODY23	97.6	99	100	100	100	100	99	97	5
O'Day 25	ODY25	96.4	98	98	97	97	96	95	94	6
Olson 30	OLS30	75.2	75	76	77	76	75	73	71	4
Paceship 23 (PY23, CB)	PSC23	97.6	100	99	99	98	97	96	95	4
Ranger 22 (Mull 22)	RNG22	92.3	93	94	93	93	92	91	90	5
Ranger 23	RNG23	92.1	95	94	93	92	91	90	89	7
Ranger 26	RNG26	86.5	89	88	87	86	85	84	84	6
S2 6.9	S2-6.9	91.4	93	92	92	92	91	91	90	5
S2 7.9 Grand Slam	S2-7.9	81.6	83	84	83	82	80	79	78	7
San Juan 21 (SK, ODR)	SJ-21	96.1	97	97	97	96	95	95	94	8
San Juan 24	SJ-24	90.7	92	91	91	91	90	89	88	7
San Juan 7.7	SJ-7.7	89.2	89	90	90	90	89	88	87	6
Santana 20 & 20W	SNT20	91.3	91	92	92	92	92	91	90	8
Santana 21	SNT21	100.7	101	101	101	101	100	99	98	7
Santana 22 w/Spin	SNT22	91.3	93	94	93	92	91	89	86	9
Santana 23 (Retr. Keel)	SNT23	84.2	83	85	85	84	83	82	82	4
Santana 525	SNT525	85.1	87	86	86	85	84	84	83	7
Sonar (Class Jib)	SNR23	81	83	82	81	80	79	78	76	3
South Coast 23	SCS23	103	106	104	104	103	102	101	99	5
Soverel 26	SOV26	79.5	82	81	80	79	78	77	76	2
Starwind 22 (SK, TMI22)	SWN22	100.9	104	103	102	101	100	99	95	6
Spirit 28	SRT28	86.9	90	89	88	87	86	85	84	4
Tanzer 22 (CB Ver.)	TNZ22B	96.8	99	98	97	96	95	93	91	5
Tanzer 22 (FK)	TNZ22	95.2	97	96	96	96	95	94	93	5
Typhoon (Albert & Cape Dory)	TYP18	106.7	110	111	110	108	106	105	104	6
Venture 21 (MH Rig)	VNT21	100.6	102	101	101	101	100	100	100	6
Venture 22 & 222	VNT22	102.6	106	105	104	103	102	100	99	7
Venture 24 & 224	VNT24	98	104	102	100	98	96	94	92	7
Venture 25	VNT25	99.4	104	102	101	99	97	95	93	5

WINDSURFER CLASSES		Handicaps (HC) by Beaufort Number								
	Code	D-PN	0	1	2	3	4	5	6	Weight Factor
Division II (SA = <6m ²)	SB-2	91.5	100	100	98	96	92	86	82	3
Division IIB (SA = 6-7m ²)	SB-2B	89.6	98	97	96	91	86	80	80	3