

PERFORMANCE HANDICAPS

Performance handicaps are based on the speed potential of a boat, determined as far as possible on observations of previous racing experiences, both locally and regionally. It is the intent of PHRF handicapping that any well equipped, well maintained, and well sailed boat has a good chance of winning.

In order to qualify for a handicap rating from PHRF of ELI, a boat must be a self-righting monohull sailed without the use of a trapeze, hiking boards or any other equipment specifically intended to support a body outboard of the sheerline. Wings that are a permanent and standard component of a boat's design are permitted. For purposes of handicapping, ratings assume a boat is fully prepared and equipped for competitive racing (i.e. good sail inventory, clean bottom, etc.). Rating credits are not given for inadequate boat preparation nor are credits extended for the carrying of excessive or oversized cruising gear or equipment. Furthermore a boat's rating does not include a factor to account for the experience level of either skipper or crew.

Well designed and constructed boats are not expected to be made obsolete by newer designs under PHRF. As faster designs appear, they are handicapped accordingly so that older boats in the fleet can continue to race competitively. Performance handicaps are not static therefore and are adjusted from time to time on the basis of a boat type's performance. The goal is always to provide each well equipped, well sailed boat with an equal opportunity to win.

Base Ratings have been established for over 200 popular production models. All boats of a specific model are given the same Base Rating. That rating assumes the boat has a standard (unmodified) hull, keel, rudder and rig and is equipped to the degree intended by the manufacturer (such as interior joiner work, bunks, galley, etc.). A boat that has altered or removed bulkheads, permanently attached furniture or structural interior components will be considered a Modified Boat.

Minor fairing of the hull/keel/rudder is permitted to correct unfairness in production molds and establish original design profiles. Fairing of the trailing edges of the keel/rudder is not considered a modification, provided any chord of the keel/rudder is not changed by more than two percent from design dimensions. Fairing of through-hull fittings, rudder gudgeons, and propeller struts is allowed.

The boat is also assumed to carry sails of a particular size and have a minimum drag engine/propeller installation. To the extent an individual boat varies from any of these base assumptions, adjustments are applied to the Base Rating to arrive at the specific rating for that boat. Typical adjustments are given in the attached tables.

When a production model is manufactured to the design and specification of a one-design class organization, it qualifies for a One-Design Rating (ODR). These ratings incorporate all adjustments arising from the design of hull and appendages and the use and restrictions of class sail sizes. An ODR is not subject to adjustment provided an engine capable of propelling the hull at hull speed in calm water is carried aboard.

Ratings of custom designed and manufactured boats and modified production boats are generated on an individual basis. Production boats with any modifications to the standard hull, appendages, rig or interior must report such modifications to the Handicap Council.

PHRF ratings are based on the information supplied by the owner on the rating application. Except in very unusual cases, the Handicap Council does not seek independent verification of any data submitted by an owner on a rating application. In signing an application for rating, or for a rating renewal, the owner attests to the completeness and accuracy of the information supplied.

PHRF REGULATIONS

PART 1: DEFINITION OF TERMS

HULL

LOA	LENGTH OVERALL OF THE HULL
LWL	LOAD WATERLINE LENGTH
BEAM	MAXIMUM WIDTH OF THE YACHT
DISPL	DISPLACEMENT OF THE YACHT IN POUNDS
BALLAST	WEIGHT OF THE KEEL IN POUNDS
INTERNAL BALLAST	WEIGHT OF ANY INTERNAL BALLAST (EXCLUDING WATER, FUEL, ETC.)

RIG DIMENSIONS

I	HEIGHT OF THE FORETRIANGLE MEASURED FROM DECK SHEERLINE TO HIGHEST POINT OF JIB ATTACHMENT
ISP	HEIGHT OF SPINNAKER ATTACHMENT MEASURED FROM DECK SHEERLINE
J	PERPENDICULAR DISTANCE FROM THE FORESIDE OF THE MAST TO THE POINT OF INTERCEPTION OF THE FORESTAY AND DECK
JC	J DIMENSION CORRECTED TO ACCOUNT FOR SPRITS OR SPINNAKER POLES EXTENDING BEYOND THE FORWARD LIMIT OF J
JS	FOR PRODUCTION BOATS, STANDARD J DIMENSION TAKEN FROM BASE BOAT RATING LIST. EQUAL TO MEASURED J FOR ONE OF A KIND BOATS.
P	FULLY STRETCHED OR BANDED LUFF LIMIT OF MAINSAIL
E	FULLY STRETCHED OR BANDED FOOT LIMIT OF MAINSAIL
PY	FULLY STRETCHED OR BANDED LUFF LIMIT OF MIZZENSAIL
EY	FULLY STRETCHED OR BANDED FOOT LIMIT OF MIZZENSAIL

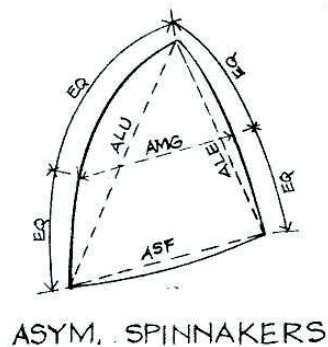
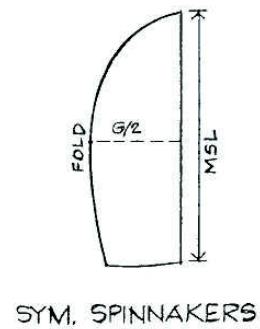
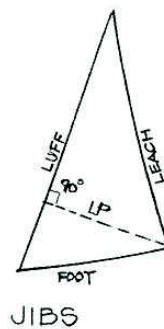
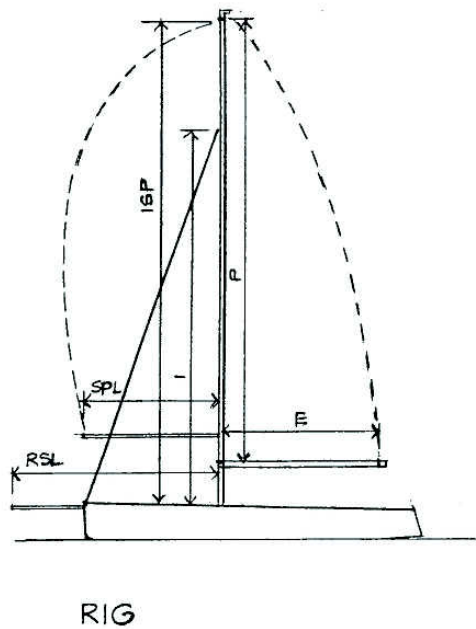
CALCULATED FACTORS

SA	RATED SAIL AREA CALCULATED AS $0.5 * [(I * J) + (P * E)]$
SA/D	SAIL AREA / DISPLACEMENT RATIO CALCULATED AS $SA / (DISPL / 64)^{0.667}$
C	THE ABSOLUTE DIFFERENCE BETWEEN A YACHT'S SA/D AND THE NUMBER 21.0
JAD	THE DIFFERENCE IN AREA BETWEEN A YACHT'S BASE JIB AND ITS RATED (LARGEST) JIB.
D/L	DISPLACEMENT / LENGTH RATIO CALCULATED AS $(DISPL / 2240) / 0.01 * (0.5 * (LOA + LWL))^{0.667}$
B/L	BEAM / LENGTH RATION CALCULATED AS $BEAM / LWL$
JCF	JIB CORRECTION FACTOR CALCULATED AS $0.1 * (JAD / DISPL / 64)^{0.667} * D/L * B/L$

SAILS

LP	PERPENDICULAR MEASUREMENT OF THE JIB FROM LUFF TO CLEW.
G	MAXIMUM GIRTH OF SYMMETRICAL SPINNAKERS MEASURED LUFF TO LUFF.
MSL	LENGTH OF SYMMETRICAL SPINNAKER LUFF. WHEN MEASURED SAIL IS TO BE STRETCHED FLAT WITH ONLY ENOUGH TENSION TO REMOVE WRINKLES.
SLIM	MAXIMUM SPINNAKER LUFF LIMIT WITHOUT PENALTY, CALCULATED AS 95% OF THEORETICAL FORESTAY LENGTH ($0.95\sqrt{I^2 + J^2}$)
ALU	ASYMMETRICAL SPINNAKER LUFF MEASURED FROM HEAD TO TACK.
ALE	ASYMMETRICAL SPINNAKER LEACH MEASURED FROM HEAD TO CLEW.
AMG	ASYMMETRICAL SPINNAKER MAXIMUM GIRTH MEASURED FROM MID-POINT OF LUFF TO MID-POINT OF LEACH.
ASF	ASYMMETRICAL SPINNAKER FOOT MEASURED FROM TACK TO CLEW.
SPL	SPINNAKER POLE LENGTH MEASURED FROM CENTERLINE OF MAST TO OUTBOARD END OF POLE WHEN SET IN A HORIZONTAL POSITION ATHWARTSHIP.
RSL	RETRACTABLE SPRIT LENGTH MEASURED FROM SPINNAKER ATTACHMENT POINT ON SPRIT TO FORWARD FACE OF MAST.
WPL	MAXIMUM LENGTH OF WHISKER POLE; MEASURED SIMILARLY TO SPL.

Sail Measurement Diagrams:



PHRF REGULATIONS
PART II : HANDICAP ADJUSTMENTS

HEADSAILS

RATING ADJUSTMENT FOR JIB SIZE IS BASED UPON A YACHT'S JIB ADJUSTMENT FACTOR (JAF) AND TABLE I BELOW. DEPENDING UPON ACTUAL JIB SIZE VERSUS STANDARD JIB SIZE, JAF MAY BE EITHER A POSITIVE OR NEGATIVE NUMBER. IF POSITIVE, ADJUSTMENT IS ADDED TO BASE BOAT RATING. IF NEGATIVE IT IS SUBTRACTED FROM BASE BOAT RATING.

TABLE 1 JIB ADJUSTMENTS

JAF	RATING ADJUSTMENT (SECONDS PER MILE)	JAF	RATING ADJUSTMENT (SECONDS PER MILE)
0.0000 - 1.316	0	22.3681 - 25.000	9
1.3161 - 3.947	1	25.0001 - 27.631	10
3.9471 - 6.579	2	27.6311 - 30.263	11
6.5791 - 9.210	3	30.2631 - 32.894	12
9.2101 - 11.842	4	32.8941 - 35.526	13
11.8421 - 14.473	5	35.5261 - 38.157	14
14.4731 - 17.105	6	38.1571 - 40.789	15
17.1051 - 19.737	7	ABOVE 40.8791	16
19.7371 - 22.368	8		

SPINNKAERS

SYMMETRICAL

RATING ADJUSTMENT IS BASED UPON THE LARGEST SPINNAKER AS MEASURED BY G/JS AND MSL/SLIM RATIOS. MAXIMUM LUFF LENGTH (SLIM) WITHOUT PENALTY IS EQUAL TO $0.95 * (J^2 * J^2)^{0.5}$. EXCESS LUFF LENGTH IS CONVERTED TO ADDITIONAL GIRTH BY MEANS OF THE FOLLOWING FORMULA: $G/JS \text{ rated} = (G/JS \text{ measured}) * (MSL/SLIM)$. EXCESS GIRTH IS PENALIZED ACCORDING TO TABLE 2 BELOW.

MAXIMUM SPINNAKER POLE LENGTH (SPL): FOR SPINNAKERS WHERE G DOES NOT EXCEED $1.8 * JS$, $SPL = JS$. FOR SPINNAKERS WHERE G EXCEEDS $1.8 * JS$, $SPL = G / 1.8$.

TABLE 2

G / JS	RATING ADJUSTMENT	G / JS	RATING ADJUSTMENT
UP TO 1.80	0	1.951 - 2.00	-4
1.801 - 1.85	-1	2.001 - 2.05	-5
1.851 - 1.90	-2	2.051 - 2.10	-6
1.901 - 1.95	-3	ABOVE 2.10	ADJUST PROPORTIONATELY

ASYMMETRICAL

LIMITING DIMENSIONS WITHOUT PENALTY ARE AS FOLLOWS: $0.5 (ALU + ALE) \leq SLIM$, $ASF \leq 1.8 JS$, $AMG \leq 1.75 JS$ AND $AMG \geq 0.75 ASF$. MEASUREMENTS THAT EXCEED THESE LIMITS WILL BE CONVERTED TO ADDITIONAL GIRTH IN A MANNER SIMILAR TO THAT USED FOR SYMMETRICAL SAILS. EXCESS GIRTH WILL THEN BE PENALIZED ACCORDING TO TABLE 2.

ASYMMETRICAL SAILS THAT ARE FLOWN WITHOUT POLE OR SPRIT BY MEANS OF A TACK PENNANT (LENGTH NOT TO EXCEED TWO FEET) ATTACHED TO THE JIB TACK FITTING QUALIFY FOR A CREDIT OF +9 SEC/MI. A YACHT CARRYING BOTH SYMMETRICAL AND ASYMMETRICAL SPINNAKERS WILL BE RATED ON THE BASIS OF THE LARGEST SPINNAKER CARRIED AND WILL NOT QUALIFY FOR THIS CREDIT.

NON – SPINNAKER RATING ADJUSTMENTS

RATING ADJUSTMENT IS BASED ON THE RATIO OF A YACHT'S MAINSAIL AREA TO THE AREA OF ITS FORETRIANGLE MODIFIED BY ITS SAIL AREA / DISPLACEMENT RATIO. THIS RATIO IS EXPRESSED BY THE TERM M/G WHICH IS DERIVED FROM THE FORMULA $M/G = P \times E + (0.6 PY \times EY) / (ISP \times JC) + (SA/D + C - 21) / 45$. M/G RATING ADJUSTMENTS ARE SHOWN IN TABLE 3.

TABLE 3

M/G	RATING ADJ.	M/G	RATING ADJ.	M/G	RATING ADJ.
0.30 – 0.39	+ 26	1.20 – 1.29	+ 17	2.20 – 2.39	+ 8
0.40 – 0.49	+ 25	1.30 – 1.39	+ 16	2.40 – 2.59	+ 7
0.50 – 0.59	+ 24	1.40 – 1.49	+ 15	2.60 – 2.99	+ 6
0.60 – 0.69	+ 23	1.50 – 1.59	+ 14	3.00 – 3.39	+ 5
0.70 – 0.79	+ 22	1.60 – 1.69	+ 13	3.40 – 3.99	+ 4
0.80 – 0.89	+ 21	1.70 – 1.79	+ 12	4.00 – 4.99	+ 3
0.90 – 0.99	+ 20	1.80 – 1.89	+ 11	5.00 – 5.99	+ 2
1.00 – 1.09	+ 19	1.90 – 1.99	+ 10	6.00 – 6.99	+ 1
1.10 – 1.19	+ 18	2.00 – 2.19	+ 9	7.00 and greater	0

MAXIMUM WHISKER POLE LENGTH (WPL) WITHOUT PENALTY: FOR JIBS WHERE LP < 1.25 JS, WPL = JS; FOR JIBS WHERE LP . 1.25 JS, WPL = 0.8 x LP

OVERSIZED MAINSAIL GIRTHS / SQUARE HEADED MAINSAILS

IN THE CASE OF YACHTS NOT BELONGING TO A ONE-DESIGN CLASS OR RACING WITH MAINSAILS DESIGNED FOR THE PRODUCTION RUN, THE FOLLOWING GIRTHS LIMITS ARE ESTABLISHED:

MAINSAIL HEADBOARDS: 6" OR 4% OF E, WHICHEVER IS GREATER, MUW =< 22%E, MTW (3/4 GIRTH)=< 38%E, MHW (1/2 GIRTH) =< 65%E. WHEN THESE LIMITS ARE EXCEEDED, THE OWNER SHALL FURNISH DATA FROM HIS SAILMAKER STATING THE INCREASED AREA ABOVE THE MAXIMUM.

MAINSAILS WITH FULL BATTENS ARE PERMITTED WITHOUT PENALTY SO LONG AS THE ROACH OF THE MAINSAIL HAS NOT BEEN INCREASED ABOVE THESE LIMITS.

RIG MODIFICATIONS

ADDITION OF FIXED OR RETRACTABLE SPRIT

AN ASYMMETRICAL SPINNAKER TACKED ON THE CENTERLINE OF A YACHT IS GIVEN A CREDIT OF 9 SEC/MI. TO RECEIVE THIS CREDIT, THE YACHT MUST SAIL WITHOUT A CONVENTIONAL SPINNAKER POLE ABOARD.

IF A YACHT TACKS ITS ASYMMETRICAL SPINNAKER TO A SPRIT OR POLE WHOSE LENGTH EXCEEDS JS, A PENALTY IS INVOKED DEPENDING UPON THE LENGTH OF THE SPRIT/POLE. IF THE SPRIT/POLE IS FIXED AND THE SPINNAKER TACK POINT REMAINS ON THE YACHT CENTERLINE, THE PENALTY IS SUBTRACTED FROM THE 9 SEC/MI CREDIT. IF THE SPRIT/POLE IS NOT FIXED AND ARTICULATES TO ANY DEGREE, THE 9 SEC/MI CREDIT IS NOT APPLIED, ONLY THE PENALTY FOR SPRIT/POLE LENGTH. PENALTIES WILL BE ASSIGNED ACCORDING TO TABLE 4.

TABLE 4

SPRIT / POLE LENGTH	PENALTY	SPRIT / POLE LENGTH	PENALTY
Up to 100% OF JS	0	112.1% to 114%	- 7
100.1% to 102%	- 1	114.1% to 116%	- 8
102.1% to 104%	- 2	116.1% to 118%	- 9
104.1% to 106%	- 3	118.1% to 120%	-10
106.1% to 108%	- 4	120.1% to 122%	- 11
108.1% to 110%	- 5	122.1% to 124%	- 12

INCREASE IN SPINNAKER HOIST (ISP)

IF A YACHT INCREASES ITS SPINNAKER HOIST (ISP) ABOVE ITS STANDARD (BASE BOAT) DIMENSION, A 3 SEC/MI PENALTY WILL BE ASSESSED FOR EACH 8% OF 1 OR FRACTION THEREOF THE HOIST DIMENSION IS INCREASED. THIS PENALTY IS SEPARATE FROM AND INDEPENDENT OF ANY OTHER RATING ADJUSTMENTS DUE TO HULL OR RIG MODIFICATIONS.

CHANGE IN RIG DIMENSIONS

A CHANGE IN RIG HEIGHT DIMENSIONS (I AND/OR P) FROM THOSE OF THE BASE BOAT ARE MEASURED BY THE RATIO OF THE REVISED SAIL PLATFORM AREA TO THAT OF THE BASE BOAT AS DETERMINED BY $((I \text{ actual} \times J \text{ actual}) + (P \text{ actual} \times E \text{ actual})) / ((I \text{ std} \times J \text{ std}) + (P \text{ std} \times E \text{ std}))$.

RATIO	RATING ADJUSTMENT	RATIO	RATING ADJUSTMENT
UP TO 0.91	+15	1.011 – 1.03	- 3
0.911 – 0.93	+12	1.031 – 1.05	- 6
0.931 – 0.95	+ 9	1.051 – 1.07	- 9
0.951 – 0.97	+ 6	1.071 – 1.09	-12
0.971 – 0.99	+ 3	1.091 – 1.11	-15
0.991 – 1.01	+ 0	ABOVE 1.111	ADJ. PROPORTIONALLY

CARBON RIG ADJUSTMENT

IN CASES WHERE THE BASE BOAT IS EQUIPPED WITH AN ALUMINUM MAST, CHANGING TO A CARBON MAST WILL RESULT IN A PENALTY ADJUSTMENT OF BETWEEN 3 AND 6 SECONDS PER MILE, DEPENDING ON THE RELATIVE SECTION OF THE ALUMINUM MAST. THERE IS USUALLY NO CHARGE FOR CHANGING TO A CARBON BOOM.

EXOTIC STANDING RIGGING ADJUSTMENT

A BOAT WITH SHROUDS AND/OR HEADSTAY MADE OF SOMETHING OTHER THAN WIRE OR STAINLESS STEEL ROD (SUCH AS PBO) WILL INCUR A HANDICAP ADJUSTMENT UNLESS ALL BOATS OF THAT CLASS HAVE SUCH RIGGING. BACKSTAYS ARE EXCLUDED FROM THIS ADJUSTMENT. THIS WILL BE CONSIDERED ON A CASE BY CASE BASIS.

ENGINE / PROPELLER ADJUSTMENTS

INBOARD ENGINE	RATING ADJ.	OUTBOARD ENGINES	RATING ADJ.
NO ENGINE	-12	NO ENGINE	- 6
ENGINE UNDERSIZED	- 6	ENGINE UNDERSIZED	- 3
FOLDING OR FEATHERING PROP	0	PROP RETRACTED WHILE RACING	0
SOLID TWO BLADE IN APERTURE	0	PROP IMMersed, TWO BLADE	+ 6
SOLID TWO BLADE, EXPOSED SHAFT	+ 6	PROP IMMersed, THREE BLADE	+ 12
SOLID THREE BLADE IN APERTURE	+ 6		
SOLID THREE BLADE, EXPOSED SHAFT	+12		