

Lake Norman Keelboat Council

Performance Handicap Racing Fleet (PHRF)

Rating Program

Introduction. Rating by performance handicap is a method of providing equitable time allowances for sailboats of different designs racing against each other. Numerous systems have been employed. Some were methods of handicapping boats, some handicapped skippers, and some combined both systems. The increased interest in the racing of cruiser/racer type sailboats has produced the Performance Handicap Racing Fleet. Measurement-based rating formulas with the attending rapid changes in boat design have turned many skippers to the performance based handicap system. Performance handicap emerges as the best assurance of continued opportunity to compete fairly against all designs, both new and old. In 1981, USYRU (now US Sailing) recognized PHRF as a full committee under its Offshore Racing Council. PHRF programs are locally administered by rating organizations throughout the United States and elsewhere. At Lake Norman the program is administered by the Lake Norman Keelboat Council (“LNKC”) Board of Handicappers under policies approved by the Board of Directors of the LNKC.

PHRF Handicaps. PHRF ratings are boat performance handicaps based on the speed potential of the boat, and are determined to the extent possible by observation of previous boat performance. However, because of the number of boats in PHRF, it is not practical to operate on statistics related to individual boats alone. A broader statistical base is obtained by treating production boats of consistent design and construction as a class. Where a class has several boats racing actively, the performance data accumulate rapidly and it is possible to arrive at a fair handicap in a short time. It is the intent of PHRF handicapping that any well equipped, well maintained, and well sailed boat will have an equal opportunity to win. PHRF ratings are not intended to reflect skipper and crew capability. Intensity of competition and the influx of new and aggressive sailors require each skipper to maintain consistently high performance in order to place well. The PHRF rating of an individual boat, expressed in increments of 3 sec/mile, is deducted from elapsed time to produce a corrected time. The higher rating indicates the slower boat. Observations of numerous races show that it is impossible to gauge a boat’s potential performance more accurately than this because of the multiple factors involved. Differences in skipper and crew skill represent a much larger factor than 3 sec/mi.

Boat Design. The PHRF is an open rule. There are no limitations on ingenuity other than those listed herein. A boat must be a monohull of self righting design. Well designed and constructed boats are expected not to be made obsolete by newer designs under PHRF. PHRF does not use formulas to determine handicaps, because any formula once established can be beaten by a clever designer. As faster designs appear, they are handicapped accordingly. Therefore, one of the major attractions of the PHRF system is that older boats can race competitively with the latest designs. PHRF discourages rule beating. If a skipper modifies his boat, PHRF will attempt to compensate for the new potential speed. The use of taller masts, longer spinnaker poles, extra ballast, gutted interiors, or other modifications intended to increase speed is compensated for by the rating assigned.

Classes. A base rating is established for each production class, and boats within a class are assumed to be identical for rating purposes. Ratings for boats in the same class will differ only with headsail size or other specific factors known to affect performance. Deviations from class regulations must be substantive to warrant a non-class rating and boats must declare any deviations from class specifications. PHRF may assign a One Design Rating (ODR) to the one design configuration of a boat that is of a design that is recognized by US Sailing as a One Design Class, however one design class rules which limit headsail size, sail materials, or spinnakers do not apply to PHRF unless the boat is rated as ODR. Each individual boat that desires to be issued a one design rating must specifically request a ODR and all class restrictions will apply when competing with the ODR. A boat may not change its rating by choosing ODR or non ODR more often than once during the calendar year.

New Class Boats. A new boat in an established class is given the rating for that class, except that adjustments may be made for deviations from the class standards. For new classes and one-of-a-kind boats, the rating is determined on the basis of comparison with similar boats with established ratings. Comparison is made considering the type of design and principal dimensions. The rating may be adjusted as performance data becomes available.

Equipment. PHRF assumes that the boat is equipped to race. It does not attempt to rate a partially equipped boat, or a boat which differs from others in its class, in that it is unusually heavy, out of balance, or has unusual windage (as from a dinghy or davits). However, if the basic hull and rig differ from others in its class, it may be rated uniquely. A skipper may experiment with different ways of improving the performance of his or her boat without the inconvenience of applying for a new rating. However, if there are changes to the hull, rig, sails, or other factors upon which the existing rating is based, they must be reported to the handicapper for evaluation. If possible deviations on the part of another boat become evident other competitors are urged to appeal to the handicapper. A detailed list of PHRF equipment requirements is contained in the Lake Norman Keelboat Council Standard Sail and Equipment Specifications which is published as an integral part of this document.

Safety Requirements. The LNKC has adopted the US Safety Equipment Requirements (US SER) governing minimum equipment and accommodations. The standards for US Nearshore found in US SER Categories at <http://www.ussailing.org/safety/equipment-and-requirements/> are recommended for PHRF class boats in LNKC sanctioned events and in club events on Lake Norman. The final burden and responsibility for safety rests on the skipper of each boat.

Auxiliaries. A boat that carries a valid rating claiming an inboard or outboard auxiliary must carry that auxiliary during every race. For a boat rated with an engine, the boat shall have enough engine and propeller power to move the boat at a speed in knots equal to the square root of her waterline length (LWL) measurement. A boat which has a valid rating issued on the basis of no engine or auxiliary may choose to carry an auxiliary; however no rating change shall be made. A boat may petition the Board of Handicappers for a re-rating, considering the presence of an auxiliary, but no more than once in any calendar year.

Headsail Size. Because headsail size can greatly affect boat speed, PHRF uses this as a rating factor. Non ODR boats are base rated for a maximum headsail LP of 155% of the boat's J measurement. A rating adjustment is made for headsails greater than 155%. A rating assigned to accommodate a large headsail will be used even if wind conditions preclude use of the sail. A boat may not change its rating by choosing a different headsail more often than once during the calendar year.

Spinnaker or Non-spinnaker. Boats possessing a valid LNKC spinnaker class rating will use the same rating regardless of whether they race in spinnaker or non-spinnaker classes. If spinnaker measurements are not submitted on the rating application, the rating will be issued for non spinnaker competition only. If a boat declares an oversize pole but does not submit spinnaker measurements, the rating will be issued without an adjustment for the pole as the use of oversize poles is prohibited in non-spinnaker classes. A boat may not change its rating by choosing a spinnaker or non-spinnaker rating more often than once during the calendar year.

Symmetric and Asymmetric Spinnakers. LNKC allows boats to be rated to race with a conventional symmetric spinnaker, an asymmetric spinnaker, or both types of spinnakers. Either type of spinnaker may be flown from a movable spinnaker pole attached to the mast or an asymmetric spinnaker may be tacked to a fitting on the bow or a retractable, movable, or fixed bowsprit. Bowsprits that extend up to 25% beyond J incur no adjustment to the boat's rating. Longer bowsprits will incur an adjustment as outlined in the Race Ratings section of the Ratings Program. Boats may race with both types of spinnakers. The choice of symmetric, asymmetric, or both types of spinnakers will be made at time of application for a spinnaker class rating. A boat rated non-spinnaker or rated for one type of spinnaker may submit application to add a spinnaker by submitting the measurements of the new spinnaker to be added. There is no rating penalty for adding a spinnaker if it conforms to the Base Rating Assumptions outlined in the Rating Program.

Courses. The PHRF rating system can be used for all types of courses. An objective evaluation of a well prepared and well sailed boat's performance on the various courses run on Lake Norman will yield a fair rating that can be used in all events conducted on the Lake.

Board of Handicappers ("the Board"). Ratings are determined by a Board of Handicappers that will consist of two (2) handicappers from each LNKC member club appointed annually by the Board of Directors of the LNKC. One member of the Board will be appointed as Chief Handicapper. The Chief Handicapper acts as chairman. With time, the handicappers become familiar with the performance of the active boats and are able to evaluate their characteristics. Through experience, the handicappers become familiar with the Lake Norman wind conditions and understand how much of an allowance to make for conditions before evaluating boat speed in competition. Handicappers maintain a constant search for boats which require an adjustment of handicap in order to permit them to compete fairly with the balance of the fleet. Handicappers are selected on the basis of an active interest in handicap racing, knowledge of boat design and performance, a judicial temperament, and demonstrated leadership in sailboat racing. Those who are active participants in racing have put aside their primary interests as contestants to evaluate boats fairly and accurately. Clearly, the system rests on the integrity of the handicappers. The names and club affiliation of the members of the Board as well as contact information can be found on the LNKC web site at www.lnkc.com.

Meetings. The Board shall convene as necessary to conduct the business of the Board. The Chief Handicapper will prepare and distribute to the members of the Board a meeting announcement and agenda, along with any documents to be considered by the Board, at least fifteen (15) days prior to each meeting. A quorum of four (4) members shall be required for the Board to take any action.

Application for Rating. Any owner or skipper of a boat requiring a rating shall apply to the Chief Handicapper using the form available at www.lnkc.com. The hull, rig and sail measurements as reported on the rating application form are critical to the establishment of the PHRF rating. The responsibility for supplying accurate measurements rests solely with the owner of the boat. Although builder-supplied information can and should be consulted, particularly with regard to hull

measurements, considerable variances between sailboats of the same model can be possible. Variances in rig and spinnaker pole dimensions are quite common, which could result in the rating being declared invalid if the owner supplied incorrect information. Accurate measurements of the largest headsail and largest symmetric and/or asymmetric spinnaker to be used are required to obtain a rating, as well as a declaration as to how the sail measurements were obtained.

Base Ratings. PHRF base ratings are made by consensus of the Board under the following assumptions. Additional requirements and definitions of the variables expressed below are contained in the LNKC Standard Sail and Equipment Specifications. Adjustments are made to the base rating if the boat does not conform to assumptions one through ten.

- (1) Genoa maximum LP is 155% of J.
- (2) Spinnaker or whisker pole maximum length (SPL) is equal to J.
- (3) Symmetric spinnaker hoist (SH) is equal to I.
- (4) Symmetric spinnaker maximum girth (G) is 180% of J.
- (5) Symmetric spinnaker maximum luff (SL) is .95 times the square root of $(I^2 + J^2)$.
- (6) Asymmetric spinnaker maximum luff (ALU) is 1.1 times the square root of $(AH^2 + BS^2)$. BS is equal to SPL if the sail is tacked at a spinnaker pole.
- (7) Asymmetric spinnaker maximum foot length (AF) is 180% of BS.
- (8) The ratio of asymmetric spinnaker mid girth to foot length (AMG/AF) shall be not less than .75.
- (9) The boat has a folding or feathering propeller, or a retractable outboard motor.
- (10) There are no modifications to the original hull or rig design.
- (11) The boat is in racing condition.

Race Ratings. Race ratings will be established by applying adjustments to the Base Ratings. Although considerations may warrant modifications, the adjustments most commonly applied for non conforming boats are as follows:

LP larger than 155% but not greater than 165%	-3 sec/mi
LP larger than 165% but not greater than 175%	-6 sec/mi
LP larger than 175%	-9 sec/mi
Bowsprit which extends more than 25% but less than 50% beyond J	-3 sec/mi
Bowsprit which extends 50% or more beyond J	-6 sec/mi

Oversize spinnaker pole	-3 sec/mi
RF Main (on/in mast)	+6 sec/mi
RF Main (in boom)	+3 sec/mi
RF Main with NO "positive leech" supporting battens= additional +6 sec to RF credit *RF main with battens (vertical or horizontal) would just receive the RF credit, no other	
Square Top Mainsail	
Head angle no greater than 95deg from tack luff	
Head width > 10% of E and up to 25% E	-6 sec/mi
Bow Thruster	
Hull opening (uncovered) over 4" diameter	+3 sec/mi
Oversize spinnaker	-3 sec/mi
Hull or rig modifications	-6 sec/mi
Exposed 2-bladed fixed propeller	+3 sec/mi
Exposed 3-bladed fixed propeller	+6 sec/mi
Roller furling above deck with UV on leech and foot	
4 to 6 oz/yd ² (UV Dacron - 4.19 oz/yd ²)	+3 sec/mi
> 6 oz/yd ² (Stamoid Vinyl Dacron, Sunbrella)	+6 sec/mi

Adjustments other than those listed above will be made by consensus of the Board.

Valid Certificate. Each applicant receives a Valid Certificate stating the current rating for the boat. The Valid Certificate is evidence of a valid rating. Valid Certificates and ratings will expire three years from the last day of the month during which the certificate is issued. A certificate holder desiring to retain a valid rating must submit to the Chief Handicapper a properly completed current rating application form prior to the expiration date shown on the Valid Certificate. Base ratings will not be changed upon certificate renewal.

Valid List. The Valid List is the official list of current handicaps of all boats rated at Lake Norman. It is kept current throughout the year and is posted at www.lnkc.com.

How Ratings Are Used. The rating to be used in a race is the rating in effect on the day of the first race for that event. It is the obligation of each competitor to declare the latest valid rating when entering a race. Only boats with current PHRF ratings may enter PHRF races. Race committees are requested to refuse entry to boats not listed on the most recent Valid List, unless the skipper can produce a more recent Valid Certificate or has been issued a single event rating.

Rating Appeals and Rating Reviews. A skipper may appeal his or her boat's rating or that of another boat. Appellants set forth their views in writing and document their case with supporting information. Rating Appeals must be submitted to the Chief Handicapper on the Rating Appeal Form available at www.lnkc.com. Any handicapper may initiate a Rating Review of a class base rating or a boat's race rating by submitting a written request to the Chief Handicapper.

Rating Appeal and Rating Review Hearings. Rating Appeals and requests for Rating Review shall be submitted no later than January 15 for hearing in February, April 15 for hearing in May, July 15 for hearing in August, and October 15 for hearing in November of each year. The skipper or handicapper advocating a change in a rating must present information to support the change in the form of race results, personal observations of the boat's racing performance, or known deviations from assumptions used to establish the rating. Certificate holders of boats with pending appeals or reviews will be notified of the date, time and place of the hearing during which the rating is to be discussed no less than 15 days in advance of the hearing and will be given the opportunity to present information justifying the current rating or supporting a change in the rating. The deliberations of the Board will be open to the Board members only. Upon receiving notification that a boat's rating is to be placed on the agenda, handicappers will avoid substantive discussions of the boat's rating with other handicappers or certificate holders.

Single Event Ratings. Single Event Rating Certificates may be issued to boats competing in races at Lake Norman. Certificates from other areas of the country will not be valid for events being conducted under LNKC PHRF handicapping guidelines and policies. Single Event Rating Certificates will be issued by the Chief Handicapper or a host club handicapper and will be valid for only that single event.

Race Results. Race results are acknowledged to provide data that can be a useful tool in handicapping. These results are used by PHRF to flag a potential misaligned rating of a particular boat class. This does not mean that because a particular boat does well the rating will be changed. However, if the race results indicate a trend in that boat class, the Board will review the rating for that class.

Sport Boat Division. The LNKC has approved a Sport Boat Division. Boats less than 45 feet length overall with sail area to displacement greater than 25 and designed to use an asymmetrical spinnaker, and boats with sail area to displacement greater than 33 regardless of type of spinnaker used shall sail in the Sport Boat Division when offered by the Race Instructions. Boats meeting Sport Boat criteria will be so designated on their Valid Certificate and on the current PHRF Valid List.

Conclusion. We hope you will enjoy racing in this open and competitive sport. The system is being refined constantly. You have the opportunity to play an important part in shaping the future for this kind of racing, not only by sailing competitively, but also by taking an active role in the management of PHRF.

Associated Program Documents:

- Lake Norman Keelboat Council Standard Sail and Equipment Specifications
- Lake Norman Keelboat Council Boat & Sail Measurements Guide
- LNKC PHRF Rating Request form
- LNKC Board of Handicappers Rating Appeal form

Approved by the LNKC Board of Directors on May 24, 2018

Summary of changes:

Original document approved February 2, 2008.

Revision approved February 15, 2009 – Incorporated the LNKC Board of Handicappers Policies into the document and revised the language regarding rating reviews and rating appeals.

Revision approved February 28, 2010 – Allowed for an asymmetric spinnaker to be tacked to a fitting on the bow and eliminated the base rating assumption that the asymmetric spinnaker maximum luff (ALU) be not less than 1.0 times the square root of $(AH^2 + BS^2)$.

Revision approved February 13, 2011 – Established that rating certificates and ratings expire three years from the last day of the month in which the certificates for each class of boat are issued and created the requirement that a certificate holder desiring to retain a valid rating must submit to the Chief Handicapper a properly completed current rating application form prior to the expiration date shown on the Valid Certificate.

Revision approved August 28, 2011 – Added a recommendation that PHRF boats racing on Lake Norman comply with Offshore Special Rules (OSRs) Appendix J, Category 5 minimum equipment and accommodations standards.

Revision approved October 2, 2011 – Deleted the requirement that boats must be at least 20 feet overall length. Established criteria for a Sport Boat Division.

Revisions approved February 8, 2015 – Updated safety equipment and accommodations recommended requirements to those listed for US Safety Equipment Requirements (US SER), US Nearshore. Added a provision that base ratings will not be changed upon certificate renewal. Changed Rating Appeal and Rating Review hearings from semiannual to quarterly.

Revisions approved May 24, 2018 – Updated bowsprit requirements and criteria for rating adjustments.