



BAREFOOT SAILING CLUB

Sailboat Racing

Pursuit & Flat Start – Beginners Guide

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February 25, 2024
Ver. 1.1



BAREFOOT SAILING CLUB

Pursuit Races - All You Need to Know

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BFSC RACES- DOCUMENT OVERVIEW

The purpose of this document is to provide a general overview (Like BFSC Races for Dummies) of how sailboat races are started, conducted, and scored. It should serve as a general reference, primarily for new members joining the Barefoot Sailing Club (BFSC), or for skippers and crew that are new to sailboat racing.

Racing can provide a wonderful and exciting experience for the skipper and crew. Racing can help improve sailing skills, fine-tune the sail trimming skills in different wind conditions, experience all roles in the boat, and help become more skillful in upwind and downwind situations.

BOAT SAFETY

For any skipper wanting to purely navigate safely, it is recommended to take basic keelboat or advanced sailing classes and also know the basic navigation rules of Stand-on and Give-way Vessels. There are several sailing schools in Lake Lanier. In addition, for any skipper or crew wanting to race, it will be important to also familiarize with **The Racing Rules of Sailing**. Several sources are available to learn the rules and a few are given below:

Navigation Rules Resources

- 1) <https://asa.com/news/2022/08/02/sailing-navigation-rules/>
- 2) <https://asa.com/news/2016/04/08/navigation-rules-quiz/>
- 3) <https://www.boatus.org/study-guide/navigation/rules/>

Racing Rules of Sailing (RRS)

- 1) <https://www.ussailing.org/competition/rules-officiating/the-racing-rules-of-sailing-2021-2024/>
- 2) <https://www.racingrulesofsailing.org/rules>
- 3) https://en.wikipedia.org/wiki/Racing_Rules_of_Sailing
- 4) <https://shop.ussailing.org/the-racing-rules-of-sailing-for-2017-2020.html>
- 5) <https://shop.ussailing.org/2021-2024-sailors-guide-to-the-racing-rules.html>



NOTICE OF RACE (NOR) & SAILING INSTRUCTIONS (SI)

For most races, the racing committee will publish a Notice of Race (NOR) and a Sailing Instructions (SI). This could be two separate documents or a single combined document that includes all the required details for a particular race. This may include dates, location, fleets, course, scoring, and the type of race start. Skippers and crew should always familiarize themselves with these documents before the race.



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PHRF RATING OVERVIEW

To Understand Pursuit (staggered) start, and sailboat racing in general, we first need to have some basic understanding of the PHRF Rating System. Performance Handicap Racing Fleet (PHRF) is a handicap number based on the boat design and performance to make races fairer when racing non-one-design fleets. **From US Sailing:** "PHRF handicaps are assigned by individuals or committees associated with specific fleets. Handicaps are assigned to a given production class considering predominant local conditions and the handicapper's experience in handicapping similar boats. These ratings are based on observed performance and any requisite adjustments generally become evident after 5-10 races have been sailed. Scoring options include Time-on-Distance or Time-on-Time." More on Scoring Later.

If all boats were one-design, let's say all sailboats are J-80's then no handicap is needed, given certain standards for sail and boat configuration. However, when there is a mix of Sailboats, how can you make it fair? Let's suppose that the following Sailboats are racing in the table below.

According to the Lake Lanier PHRF, the table below shows some real examples. Note that typically (but not always) the larger the boat will have a lower PHRF rating since typically a larger boat will be faster. Ratings can also depend on sail size and area, and other factors for each specific sailboat configuration. Please understand that no rating system is perfect.

PHRF rating is based on the units of **seconds per mile (s/m)**. Therefore, if a Catalina 22 has a PHRF rating of 270 and the Tartan 28 has a PHRF rating of 171, and they compete on a 1-mile course (start at the same time), then the Tartan 28 should finish approximately 99 seconds in front of the Catalina 22. To make races fair, the results are adjusted for handicap (PHRF rating) by the race committee after all competitors have finished.

<https://sail-lanier.com/phrf/>

Sailboat	Size	PHRF
Catalina 22	22	270
Tartan 28	28	177
Pearson 33	33	147
Hunter 34	34	153
Catalina 380	38	150

Then to try and make things even more fair, depending on the number of sailboats registered, we split races and sailboats into classes/divisions. For example, we can have a SPIN / No-Spin and a High/Low PHRF class. In some races, we may need to combine Spin and Non-Spin in one class. In this case, we may or typically add 15 s/m to the non-spin PHRF sailboats.



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PURSUIT (STAGGERED) START:

What is Pursuit Starts?

A pursuit start provides a fun way for those new to sailboat racing to get started, or when the club needs to simplify racing. The staggered start eliminates the normal stress and anxiety of a group of sailboats starting across the start line, with its potential conflicts, and makes the chase a fun race.

Each sailboat is assigned a START TIME. The starting times are calculated based on the length (distance) of the course and the PHRF rating of the boat. The key difference with a Pursuit Style format is that the sailboat with the highest PHRF rating (theoretically the slowest) starts first, and the boat with the lowest PHRF (theoretically the fastest) starts last. Then everyone in-between has a specific start time based on their PHRF rating and course distance.

The START TIMES are calculated based on the slowest boat (Highest PHRF), which means that ideally, all boats should be pre-registered so that a calculation can take place to assign the START TIMES before the race start.

The start times are calculated so that all boats theoretically finish at the same time, therefore, if you overtake a sailboat during the race, then typically you beat them. As Sailboats cross the finish line and finish the race, scoring is based on the order in which each boat finishes, and the corresponding ranking order of winners.

One exception, to the above, is when the wind calms in the middle of a race and the race needs to finish at the "short-finish" mark. Since start times are initially based on the distance of the full course, and now the sailboats will finish at a shorter distance, we need to verify the final positions by scoring Time-on-Distance after the race. More on [scoring](#) later.

Positives of Pursuit Starts

- No Need for Race Committee Boat
- No stress race start – each skipper has its own start time
- Low risk of collision with other boats
- No scoring needed - Winner and ranking order are known immediately – boats finish order is ranking order
- Easy to introduce racing for new skippers

Negatives of Pursuit Starts

A reason some experienced sailors do not like pursuit start races is that they believe this can introduce some variability given the shifts in wind intensity and direction during the race. For example, a sailboat can start first with good wind, and then suddenly the wind shifts or calms several minutes later when the 2nd sailboat is scheduled to start. However, as the race progresses, the ideal concept is that the conditions will average-out throughout the race and make it fair for all racers, or at least average-out throughout the number of races.



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Another reason, although of less impact, is that the start time and the finish time are based on the honor system. Skippers are required to synchronize their watch or clock with the Atomic or NIST time at: <https://www.time.gov/>. Skippers are required to start at their assigned time (Honor System) and self-report the finish time to the racing committee (Honor System), as there is no oversight because the race committee boat will be absent.

How Start times are calculated

The starting times are calculated based on the length (distance) of the course and the PHRF rating of the boat. In theory, START TIMES should be back-calculated for every boat based on the highest PHRF of the slowest sailboat in the race, or by letting the racing software do the calculations automatically.

To keep things simple, and efficient, BFSC bases the START TIME on a theoretical slowest possible boat (Highest Possible PHRF) of **345**, instead of using the slowest boat at each race (since this can vary every race). This practice facilitates the assignment of start times quickly, at the skipper's meeting, using a quick calculation, or reference tables (Pursuit Handicap Tables) that have been developed and published on the BFSC website and where skippers can quickly learn their start times.

https://www.barefootsailingclub.org/files/ugd/8f8b78_fd35f8e73ff747e591be981a3984234c.pdf

Example of Start Times: Assume the Race START time is 1:00 PM with a race course Distance of 12.5 NM.

Sailboat	Size	PHRF	Distance (NM)	Offset Time	Start Time
Catalina 22	22	270	12.5	0:15:37	1:15:37
Tartan 28	28	171	12.5	0:36:15	1:36:15
Pearson 33	33	147	12.5	0:41:15	1:41:15
Hunter 34	34	153	12.5	0:40:00	1:40:00
Catalina 380	38	150	12.5	0:40:37	1:40:37

Let's take TARTAN 28 as an Example. To learn the Start Time you can look up the offset time using the published BFSC Pursuit Standardized Tables, knowing the race distance and the sailboat PHRF. You can, however, manually calculate it as well.

Manually Calculate:

To learn how to manually calculate let's take the details of the **Tartan 28** above.

For the Offset Minutes = Take 345 minus PHRF divide by 60 (convert seconds to minutes) and multiply by Distance. **Offset Minutes = (345-171)/60*12.5 = 36.25 = 36 Minutes**

For the Offset Seconds = Take the remaining decimal and multiply by 60 (Convert Decimal Minutes to Seconds). **Offset Seconds = 0.25*60 = 15.00 = 15 Seconds**

Therefore, combine the Minutes and Seconds to obtain: **OFFSET TIME = 0:36:15**

To Calculate the Start Time, then add the Start Time of the race to the offset time; in this case 1:00 PM:

START TIME = 1:36:15



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Automatically Calculate:

You can automate offset time calculation in Excel (and Google Sheets) easily by using the following formula. **OFFSET TIME = (345-PHRF) / 60 * Distance in (NM) / 1440**

The 60 and 1440 are time conversions for HH/MM/SS format

NOTE: Ensure you format CELL as Time Duration 00:00:00

FLAT START:

What is FLAT Start?

FLAT STARTS, as the name implies, means that all boats (of the same fleet) start at the same time. Depending on the number of boats, one or more fleets can start at the same time. This can create some stress and anxiety, especially for new skippers or sailors, as all boats compete for the favorite-end and position to start and cross the start line first. **Knowing the Racing Rules of Sailing will be critical to avoid collisions and prevent mishaps.**

Many races hosted by Lake Lanier Sailing Club / Keelboat and University Yacht Club are Flat Start Races. One reason many skippers like FLAT START is that the start of the race feels more competitive while trying to achieve a perfect start. Also, Different from Pursuit Starts, all skippers will experience the same wind since they are all starting at the same time.

Typically, for FLAT START races, there will be a racing committee and a racing committee boat that will control and coordinate the start and timing of the race. The race committee/boat will typically indicate the following:

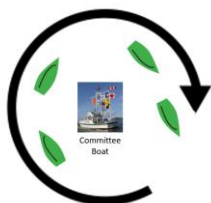
- 1) Course and Rounding Mark Side (Port/Starboard) (this could be on the NOR/SI)
- 2) Number of Fleets and Fleet Number (Flag) (this could be on the NOR/SI)
- 3) Order of Start for Fleets
- 4) Race Time Start

The race committee/boat includes several Race Signals (Flags and Horns), and will hold and control a race start sequence for each start that skippers and crew need to understand.

Following will try to break-down some key components of Flat Starts:

Rounding Committee Boat

The race committee boat will post some race instructions, like the Course and Fleet Start Order – usually at the stern of the boat. Skippers should round the committee boat **Clockwise** to avoid collision with other boats while reading and capturing these instructions.





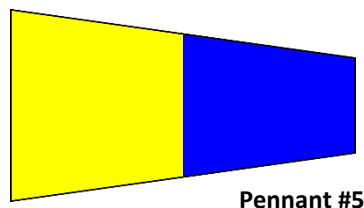
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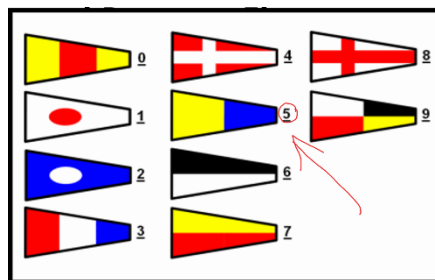
Fleet Number and Pennant Flag

Either in the NOR/SI or the race committee boat, each Fleet will have an assigned Fleet number. For example, if the Cruiser Fleet is assigned Fleet number #5, then this will indicate the Race Signal Flag that the race committee boat will use for the start sequence of the Cruiser Fleet.

For example, in the Flag chart below, Flag #5 is the Yellow/Blue Flag. The Race Committee will use this flag for the start sequence of Fleet #5 – Cruiser Fleet.



Pennant #5



Additional Key Pennant Flags

Description	Pennant Flag	
Signals which Boat is the Race Committee Boat		
Afloat: Come Within Hail		One Horn Signal
Preparatory (PREP) - The P (Preparatory) flag goes up at four (4) minutes before the start.		One Horn Signal
Races Postponed		One Horn Signal
All races that have started are abandoned		One Horn Signal
One or more boats have started prematurely.		One Horn Signal



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Race Start Sequence

The START SEQUENCE is probably one of the most fun factors why skippers enjoy the Flat Starts, but also the one that most common skippers get wrong because it requires a lot of coordination and practice, and can be stressful and confusing for newer skippers. Some hard-core racers perform practice drills with a full crew to gain the start advantage. Assuming that it's time for Cruiser Fleet #5 to start, the following is an example of the horn and flag signal of the starting sequence.

Horn Signal	Description	Minutes Before START Signal	Flag Signal
1-Horn	Class Flag Up	5	
1-Horn	Prep Flag Up	4	
1-Long Horn	Prep Flag Down	1	
1-Horn	Class Flag Down	0	

Positives of Flat Starts

- All boats in the same fleet start at the same time
- Feels more competitive since skippers apply tactics and boat handling skills competing for favorite-end and positioning for a good start across the start line
- The start sequence requires mental and physical concentration – creating a competitiveness feel

Negatives of Flat Starts

The race start can be intimidating and confusing at the beginning and skippers need to be familiar with the Racing Rules of Sailing to avoid collisions and prevent mishaps. Applying “Rules of the Road” and “Racing Rules of Sailing” become critical. This can create some stress and anxiety, especially for new skippers, as all boats compete for the favorite-end and position for a good start across the start line, ahead of others. In addition, the race start sequence can also take some time and practice to learn.

SCORING

Scoring races can be done using typical software or a spreadsheet application like Microsoft Excel or Google Sheets. There are two types of PHRF scoring, Time-on-Distance (TOD) and Time-on-Time (TOT). The TOD is the more traditional and easier to understand and the one used by BFSC and most lake clubs.

Time-on-Distance (TOD):

In TOD, you use your PHRF (handicap) for the length of the race course. The Elapse Time is corrected using PHRF and Distance to calculate a Corrected Time.

- 1) Elapse Time = (End Time) – (Start Time)
- 2) Corrected Time = [Elapse Time] – [(PHRF * Distance)] plus applying conversion factors for time



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Manually Calculate:

Let's use as an example a sailboat with **PHRF = 186** and **Distance = 5.2** Nautical Miles

Race **Start Time = 13:00:00**, **Finish Time = 14:22:22**

Elapse Time = 14:22:22 – 13:00:00 = 1:22:22

For Corrected Minutes = $186 * 5.2 / 60 = 16.12$ (**16 minutes** correction)

For Corrected Seconds = (Take the leftover decimals) = $0.12 * 60 = 7.2$ (**7 seconds** correction)

Corrected Time = 1:22:22 – 0:16:07 = 1:06:15

Automatically Calculate:

If using Microsoft Excel or Google Sheets:

- 1) Corrected Time = [Elapse Time] – ([PHRF]/[60]/[60]/[24] * [Distance])
- 2) Simplifying formula use: $86400 = (60 * 60 * 24)$, (conversion factors)
- 3) **TOD = Corrected Time = [Elapse Time] – ([PHRF]/86400 * [Distance])**

NOTE: Ensure you format CELL as Time Duration 00:00:00

Mixed Fleet:

In some cases, for logistic reasons, or because there is a small number of boats in different fleets, we may group PHRF race boats using Spinnakers and Keel Boats with non-Spin in the same fleet. In these cases, we may add 15 seconds per mile to the PHRF of Keelboats to make the race fairer.

Ranking:

Who wins the Regatta? After Calculating the Corrected Time, we force rank boats based on the Corrected Time value. In a regatta or when multiple races, these ranks are aggregated to obtain the total rank. In the example that follows, Boat-2 is the Winner, and Boat-1 is second place.

RANKING

Boat Name	Race-1	Race-2	Race-3	TOTAL
Boat-1	2	3	1	6
Boat-2	1	1	2	4
Boat-3	3	3	3	9
Boat-4	4	4	4	12

Common Race Status and Ranking

Some of the most common statuses for races are described below with the corresponding Rank value:

- 1) **DNC** – Did Not Compete. Normally carries a rank = number of boats registered in a series + 1. For example, if 3 boats are present for the race and 5 total boats are in the class/division, then DNC boats should be scored 6.
- 2) **DNS** – Did Not Start. Normally carries a rank = number of boats in race + 1
- 3) **DNF** – Did Not Finish. Normally carries a rank = number of boats in race + 1

In some cases, BFSC may change DNC to carry a higher penalty (For example number of boats registered in a series + 2) to give credit to the skippers that show up for races vs the no-show.



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COURSES and Markers

Pursuit Start

Courses for Pursuit Start typically use the Lake Permanent Markers and are normally provided to skippers ahead of the race – since we need the distance to calculate the Start Time. To keep things simple and efficient, BFSC has developed standard courses which are published on the BFSC website, and an example is below. Also, note that a Short-Finish for each standard course has been identified in case there is a shift in the weather or wind calming skippers should always take the time at the short finish in case needed.

https://www.barefootsailingclub.org/files/ugd/8f8b78_f2d69e84335d4b1faae91c80fc2918d4.pdf?index=true

Barefoot Sailing Club -- 2021 Pursuit																								
Course Number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Starting Mark	X-P	X-P	X-S	X-P	X-S	X-P	X-P	X-P	X-P	X-P	X-P	X-P	X-P	X-P	X-P	A-P	A-P	X-P	X-P	A-P	X-P	X-P	X-P	
	B-P	B-P	B-S	C-S	C-S	D-P	13-S	13-S	A-S	A-P	E-P	T-P	A-P	A-P			H-P	C-P	D-P	D-P	D-P	D-P	D-P	
	H-P	H-P	E-S	E-S	T-P	E-P	11-P	11-P	T-S	X-P	C-P	C-P	H-P	H-P	13-S	T-P				A-S	Finish		T-P	T-P
															11-P	A-P								
															13-P									
Short Finish - record your time at this mark.	X-S (5.3)	B-S (5.9)	B-S (3.7)	C-S (2.8)	B-P (3.2)	F-P (2.5)	13-P (4.4)	13-P (4.4)	X-P (2.5)	E-P (2.0)	X-P (2.2)	X-P (2.6)	X-S (5.2)	X-S (5.2)	H-P (6.2)	X-P (2.5)	X-S (4.4)	X-P (1.2)	X-P (1.6)			T-P (2.3)	X-P (3.0)	X-P (3.0)
	E-P	X-S Finish	X-S Finish	E-S	E-S	D-P	X-P Finish	H-P	E-P	A-P	E-P	E-P	E-P	A-S	A-P	T-P	E-P	E-P			X-P Finish	D-P	D-P	D-P
	B-P			X-P Finish	X-S Finish	E-P		X-P Finish	X-P Finish	X-P Finish	C-P	X-P Finish	X-P Finish	A-P	E-S	X-P Finish	A-P	X-P Finish	X-P Finish				T-P	X-P Finish
	X-P Finish					X-P Finish					X-P Finish			X-P Finish	X-S Finish		X-P Finish						X-P Finish	X-P Finish
Distance (nautical miles):	8.1	6.9	4.6	4.4	5.1	5.8	6.7	7.1	3.5	3.9	4.4	3.6	6.1	7.5	10.6	4.8	6.9	2.2	2.6	2.3	3.0	6.1	4.6	

Flat Start / Regattas

Courses for Flat Start and Regattas are typically provided and displayed by the Race Committee boat right before the start of the race. These can be the temporary markers or the lake permanent markers or a combination of both.

RACES & CLUBS LAKE LANIER

Races are hosted by several Clubs on the lake. Individual clubs host and manage their races for their club members although several races are hosted and managed by The Lanier Auxiliary Racing Committee (LARC), an organization that is formed by members of the three sailing clubs on Lake Lanier and that coordinates racing between the various clubs. Therefore, a club member of any of the three (3) clubs can participate in the LARC Races. Some are free and some carry a small cost.



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Barefoot Sailing Club (BFSC)

<https://www.barefootsailingclub.org/>

Founded in 1971, BFSC originally focused on dinghy racing. But, over the years have expanded much further. Members enjoy racing on cruisers and racing boats, cruising around the lake, and rafting up for social activities. BFSC hosts the Spring and Fall Racing Series, First Saturday Cruises, Regattas, and member socials, among other things.

Lake Lanier Sailing Club

<https://www.llsc.com/>

Lake Lanier Sailing Club (LLSC), one of the oldest clubs in the lake, is a physical club with a private marina located in Lake Lanier. The club not only hosts races for its club members, but also has an active Junior school and races for younger sailors to learn and enjoy sailing and racing, and active social events.

University Yacht Club (UYC)

<https://www.universityyachtclub.org/>

UYC is also a physical club with a private marina with a private restaurant located in Lake Lanier. The club not only hosts races for its club members, but also has a year-round Junior sailing program for younger sailors to learn and enjoy sailing, and active social events.

The Lanier Auxiliary Racing Committee (LARC)

<https://www.llsckeelboat.com/>

The Lanier Auxiliary Racing Committee (LARC) is formed by members of the three sailing clubs on Lake Lanier to coordinate racing between the various clubs BFSC, LLSC, and UYC. LARC coordinates the racing calendar events to minimize conflicts and allows all the clubs to share in the burden of mark replacement and repair. Participation in the LARC fall and winter series is free to all skippers in good standing of any hosting authority; BFSC, LLSC, and UYC.

The Wednesday night races are sponsored by the LLSC Keelboat Fleet. From the LLSC website:

"The Keelboat Fleet sponsors several events throughout the year including: the Wednesday Night Series I & II (two 10-race series) & Wednesday Night Encore Series (5 races), the Dogwood Regatta in the spring, and the weekend PHRF Championship Series (3 race days throughout the year). Additionally, we participate in the Lanier Cup, a lake-wide club championship challenge."

There is a charge to participate in these events.



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LAKE LANIER MARKERS

