

# AMERICAP - An American Handicap System

## ***What is AMERICAP***

Americap is an ocean racing yacht measurement handicapping and scoring system. It is derived from IMS. It's comparable to IMS in handicapping accuracy and to PHRF in simplicity of certification and scoring.

## ***How does Americap compare with PHRF?***

PHRF is based on past performance of a yacht and her sisterships. It attempts to handicap the yacht but not the skipper, but that may be impossible to totally avoid, particularly if the yacht is one of a kind or one of a small fleet in a given locality.

PHRF is based on a few critical measurements and past performance. PHRF ratings for the same class boats differ from one area of the country (and area of California) to another. In Americap, identical boats have identical ratings everywhere. Americap ratings are based *solely* on a large number of measurements used in a sophisticated computer model called a Velocity Prediction Program, (VPP) which predicts a yacht's performance under optimum trim and helm under various wind conditions.

PHRF ratings are expressed in a single number, usually seconds per mile. The PHRF time allowance is called time-on-distance. As such, it has limited ability to account for differences between boats on different courses and no ability to account for different wind conditions.

Americap's two number rating system provide a time allowance that depends on both distance and elapsed time. This enables it to handicap diverse yachts fairly over a wide range of wind conditions

## ***How does AMERICAP compare with IMS?***

AMERICAP is derived from IMS and affords essentially equivalent accuracy. Like IMS it is an Implied wind, course sensitive system. But it is far simpler to get a yacht certified, and it is far simpler to score than IMS. Like IMS it recognizes and accounts for the fact that different yachts may have the same speed potential under one condition, but may be vastly different (more than 50 seconds per mile) for different course or wind speeds.

## ***How can AMERICAP take these differences into account?***

Two things. Just like IMS:

1. The course is specified broadly before the race and the handicap pertains to that specific course.
2. The "implied" wind speed is inferred (implicitly) for each yacht from the elapsed time it takes to finish the prescribed course.

Of these two effects, the more sensitive and important one is the wind speed dependence.

### ***What kinds of course does it handle?***

In order to simplify the system as much as possible, the infinite number of course possibilities under IMS has been trimmed down to just five:

- Closed Course - All Purpose (CCAP) (For most round the buoys races involving some reaching legs)
- Closed Course - Windward/Leeward (CCWL) (No reaching legs)
- Offshore Course - All Purpose (OCAP) (Point-to-point courses, some beating, mainly reaching, , e.g., Los Angeles to Catalina)
- Offshore Course - Mainly Downwind (OCMD) (Point to point, mainly downwind, typical of Mexico or Transpac races or returns from Catalina.)
- Non-Spinnaker - All Purpose (NS) ( Same as CCAP but no spinnaker)

This provides a sufficient spectrum of choices to capture the essential accuracy advantage of course sensitivity.

### ***How does AMERICAP Scoring compare with IMS scoring.***

IMS uses a complex scoring system called Performance Curve Scoring (PCS). It can only be applied by a computer program. It is difficult for race administrators to use and virtually impossible for racers to understand and use or check race committee results.

AMERICAP is based on extensive studies showing that the implied wind system can be implemented with a two number handicap for each course. These two handicap numbers called TOT (for Time-On-Time) and TOD (for Time-On-Distance) are used as follows to compute corrected time, in terms of Elapsed Time and Distance by the following simple formula.:

$$\text{Corrected Time} = (\text{TOT} * \text{Elapsed Time}) - (\text{TOD} * \text{Course Distance})$$

This is exactly the calculation done by the scoring committee, and it can easily be duplicated exactly by the racer with a hand calculator, either on the course or after the finish. For a given course and scratch boat, the results of this calculation are effectively equivalent to the more complex PCS scoring calculation.

### ***What is the difference between Time on Time (TOT) and Time on Distance (TOD)?***

TOT is a factor applied to a boat's Elapsed Time whereas TOD is a factor applied to the race course distance. PHRF scoring is an example of TOD (Rating \* Distance/3600) and ORCA (Ocean Racing Catamaran Assn) uses TOT (Rating \* Elapsed Time) . Neither system can correctly handicap diverse yacht types under different, off-nominal wind conditions. By deriving the two coefficients from IMS type data, Americap, incorporating both TOT and TOD provides very accurate accounting for various wind conditions.

**How does Americap Scoring Compare with PHRF and ORCA Scoring**

ORCA :        CT = TOT x ET  
 PHRF:        CT = ET – TOD x Dist  
 Americap:    CT = TOT x ET – TOD x Dist

where CT = Corrected time  
 ET = Elapsed time  
 Dist = Course length  
 TOT, TOD = Time-On-Time and Time-On-Distance rating numbers

Of course the actual values of TOT and TOD are different from those in ORCA or PHRF.

**What do I need to know about TOT and TOD to correctly use them in the Scoring Formula?**

In the formula *Corrected Time = (TOT \* Elapsed Time) - (TOD \* Course Distance)*, TOT is the multiplier of Elapsed Time. Elapsed Time is the length of time between a yacht's Starting Time and a yacht's Finish Time, i.e. *Elapsed Time = (Finish Time - Start Time)*.

TOD, as provide by US SAILING and SCORA, is in units of *seconds per mile*. Therefore, when deriving Corrected Time, Elapsed Time must also be in units of seconds. To convert Elapsed Time, expressed in hours, minutes and seconds to all seconds, perform the following multiplications and additions

$$ET_{seconds} = (HH * 3600) + (MM * 60) + SS.$$

E.g., An Elapsed Time of 2 hrs, 15 mins, 10 secs  
 equals (2 \* 3600) + (15 \* 60) + 10 = 8100 seconds.

For long offshore races, where working with Elapsed Time in decimal hours is more practical, the TOD rating can be converted to hours per mile by dividing TOD by 3600. The TOT coefficient is the same in either case.

**How does the Americap Certificate differ from an IMS Certificate?**

To obtain an IMS Rating Certificate, an owner must haul out his boat and pay for the services of an IMS certified measurer to take many intricate measurements of the boat—a costly and time-consuming process. These measurements are sent to US SAILING and run through an IYRU Velocity Prediction Program (VPP) to derive a 112 number data matrix of seconds per mile ratings for 7 wind speeds and 16 courses. Americap has simplified both the measurement process and the certificate. A boat applying for Americap ratings is asked to provide only measurement data that differ her from a standard “sister-ship” within the US SAILING Data Base such as height of mast, propeller type. The complete measurements for the prototype of the same type boat have been provided by a certified measurer or by the yacht designer. The Americap Certificate issued to the owner displays the supplied measurements of his boat and just five pairs of ratings: a TOT and a TOD rating for each of five types of race courses.

***What are the advantages of Americap?***

- Accurate, objective assessment of Optimum Performance under varying wind and course conditions.
- Equitable handicapping of a wider range of boat types
- Inexpensive Certification Process & Annual Fee.
- One nationally recognized set of ratings for each boat.
- Easy to understand, easy to implement scoring algorithm.