Singlehanded Sailing Society

Singlehanded Transpac Seminar Series

Sails & Rigging

December 9, 2015

Synthia Petroka
Marine Textile Engineer

- Sailmaker Since 1993 - First Hawaii Race 1998
- Ullman Sails San Francisco Monterey Bay – Sails
- Beats Mowing The Lawn – Custom Marine Canvas
- 5 Hawaii Races, 2 Returns
- Singlehanded & Doublehanded: Hawkfarm 28
- Full Crew: Hobie 33, Zaal 38, Schumacher 52

PHRF Ratings & Sail Nomenclature

NORTHERN CALIFORNIA PERFORMANCE HANDICAP RACING FLEET (NCPHRF)

http://www.yra.org/PHRF/docs/ncphrf_rules_and_guidelines.pdf

Revised November 2015

NORTHERN CALIFORNIA

PERFORMANCE HANDICAP RACING FLEET (NCPHRF)

PART 1
RULES AND GUIDELINES FOR HANDICAPPING

PART 2
ASSISTANCE IN FILLING OUT AN APPLICATION FOR HANDICAP

Yacht Racing Association
1070 Marina Village Parkway, Suite 202-G
Alameda, CA 94501
www.yra.org phrf@yra.org
Phone 415-771-9500 Fax 415-276-2378

ls & Rigging

PART 2

ASSISTANCE IN FILLING OUT AN APPLICATION FOR HANDICAP

SAIL NUMBER

This should be a number that the YRA office has assigned to your boat. Please call the YRA office for more information. Sail Prefix is a country code. This space can be blank or it might say USA or IRL.

CLASS/TYPE

We are looking for the type of boat you have, like a Cal 20, or Islander 36. If your boat is custom made, or one-of-a-kind, please indicate. If it was designed under some rule, please tell us what rule; e.g.: 6 meter, IOR 1/4 ton, etc. In this case, if you have any measurement certificate, no matter how old, please include a copy of it with your application for rating.

ONE DESIGN RATING

Read Section V above to find out if this applies to you at all. It is anticipated that other members in your class who know and understand your rules and limitations, as modified by Section V, will monitor the ODR ratings.

RIG AND SAIL MEASUREMENTS

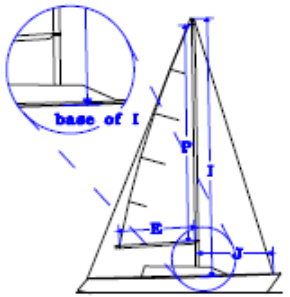
What is the source of the information provided? We are looking for where you obtained the information on your certificate. Please indicate by circling which sources apply.

Foretriangle

I Vertical distance from upper point of "I" to lower point of "I"
Upper point of "I" is the highest of:
1. Intersection of mast and highest jibstay.
2. Highest sheave for jib halyard drawn horizontal to mast.

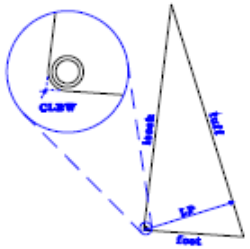
Lower point of "I" is the sheerline abreast the mast (not the cabin top).The sheerline is the intersection of the deck and the hull.

J Horizontal distance from mast to where the forward most jibstay intersects the deck, or jib tack. Note that 'JC' is no longer on this form.



Largest Headsail

Largest Headsail percent is LP/J * 100. The LP (Luff Perpendicular) of your jibs is determined by measuring the distance from the clew to the nearest point on the luff. This is done by holding the zero end of a tape measure at the clew (defined as the intersection of the leech and the foot), removing the wrinkles from the area to be measured, and swinging an arc up and down the luff, recording the minimum distance, then dividing by J and multiplying by 100. For example, suppose you measure an LP of 15.5 feet on your biggest headsail, and your J is 10 feet. Your largest headsail is 15.5/10 * 100=155%, which happens to be the largest non-penalty headsail allowed under PHRF for a 10' J. Your sailmaker is also a source of information on sail dimensions.



SPL = Spinnaker Pole Length

Spinnaker Pole Length is the length of the spinnaker pole when set in position on the mast; measured from the front face of the mast to the extreme outboard end of the pole. Please note the distinction between a whisker pole and a spinnaker pole: A whisker pole may be used to pole out any jib (but may NOT attach to any type of spinnaker), may be of any length, and may be adjustable. Information on your whisker pole is not required by PHRF, and should not be used as an answer for the spinnaker pole length, as it will often draw an unnecessary penalty.

ISP ("I" for the spinnaker)
ISP = spinnaker hoist - measured from the underside of the spinnaker halyard, when drawn horizontally forward from mast, to the level of the sheerline abreast the mast. The sheerline is the intersection of the deck and the hull.

Note: in some cases "I" and "ISP" are the same. If your spinnaker halyard exits the mast above the upper point of "I" as described above, then your "ISP" will be greater than "I".

JSP (for boats with sprits and asymmetric spinnakers only)
JSP = spinnaker "J" Horizontal distance from mast to the forward most attachment point for the spinnaker tack. If this location is adjustable, as with an adjustable bow pole, then measure with the bow pole fully extended on centerline.

Type of Rig
Sloops come in two varieties: 'masthead,' where the forestay goes to the top of the mast, and 'fractional,' where the forestay is anchored to the mast somewhere below the top of the mast. Other types of rigs include Ketch, Yawl, Cutter or Catboat.

Mast Material
What is your mast made of? Common materials are Aluminum, Wood, Carbon, Fiberglass, and 'other.'

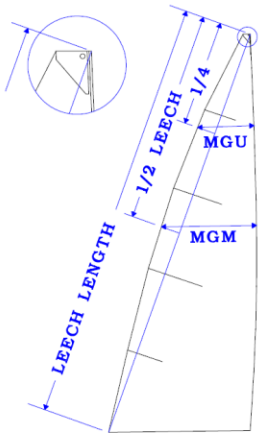
Standing Rigging Material
What material are your shrouds made of? In part, we are looking for boats that have changed their standing rigging.

Mainsail

P = Mainsail Hoist (distance between bands).
E = Mainsail Foot (distance from aft edge of mast to the inner edge of the band on the boom)

HB = The total width of the top of the sail from the front of the luff rope to the top aft corner.

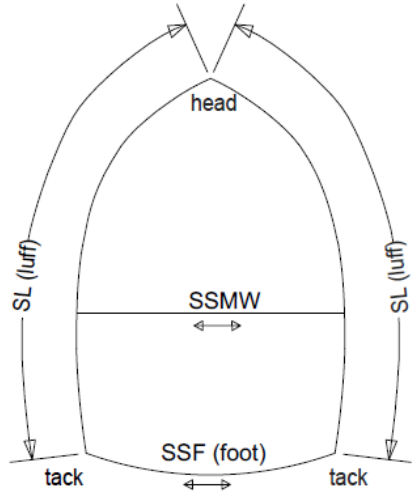
MGU and MGM
MGU (Main Girth Upper) and MGM (Main Girth Middle) are girths measured on your mainsail. These girths measure the width of mainsails 1/4 and 1/2 the distance down the leech from the head. Measure your girths by folding the head (front corner of headboard) to the clew, smoothing the leech and marking the fold at the leech (MGM starting point). Next fold the head to the mid-leech point and mark this new fold on the leech (MGU starting point). Now lay the sail out flat. Hold the zero end of a tape measure at the MGM starting point on the leech. Swinging an arc up and down the luff, record the minimum distance measured as your MGM. Remove the wrinkles from the area to be measured. Repeat this process for measuring your MGU.



Py and Ey are similar to P and E dimensions for the aft sail on ketches, yawls and schooners.

Symmetric Spinnaker

Symmetric spinnakers have the following characteristics: (a) luffs are of equal length; (b) the sail is symmetric about its vertical centerline.
SL = Spinnaker Luff (See Part 1 Section VI "Assumptions" Paragraph I for the non-penalty limit.)
SSMG (Symmetric Spinnaker Mid Girth)
SSMG is determined by measuring the width of your sail at mid luff to mid luff.
SSF = spinnaker foot length



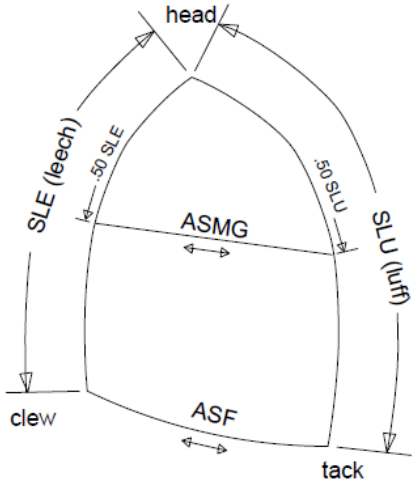
Asymmetric/Cruising Spinnakers

Non-Penalty Area Limits
Cruising /Asymmetric Spinnakers are limited in area not to exceed the area of I and J (or ISP and SPL) based 180% symmetric spinnakers for that boat. To calculate the actual area for the symmetric spinnaker, use the formula for "Area" below, substituting SL (symmetric spinnaker luff) for SLU and SLE.

The formula for determining the actual area of all types of spinnakers is as follows:
Area = (SLU+SLE) x .25 x ASF + (ASMG-.5ASF) x (SLU+SLE)/3
In the case of Symmetric Spinnakers, replace SLU and SLE with SL, ASMG with SSMG, and ASF with SSF.

SLU = spinnaker luff length
SLE = spinnaker leech length
ASMG = spinnaker mid girth measured between the mid-points of the spinnaker luff and spinnaker leech
ASF = spinnaker foot length

Note on ASMG:
ASMG less than .75*ASF is not allowed.



How far aft can you articulate your spinnaker tack?
0 degs (fixed)
____ degrees
We want to know if you plan on setting the tack of your cruising or asymmetric spinnaker on a pole that can be squared aft. Sails set from the bow of the boat, or from a non-rotating pole (bow sprit), are of the zero degree category. If the tack of the sail is set on a pole that can be rotated while sailing, we want to know the maximum angle of rotation, measured at the mast between the centerline of the yacht and the pole. If an Asymmetric spinnaker is tacked to a spinnaker pole, articulation must be listed as 90 degs.

Please fill out the following two fields in the "Foretriangle" box:
ISP = spinnaker hoist, measured from the underside of the spinnaker halyard, when drawn horizontally forward from mast, to the level of the sheerline abreast the mast.
JSP = farthest distance from front of mast to asymmetric spinnaker tack location. Note that this can be much greater than J on sprit boats.

Setting and Sheeting Limits: For Asymmetric spinnakers
TACK: Sail may be tacked to the deck or to a pole. PHRF Application must state if the pole can be articulated to move the tack off hull centerline and how many degrees it can move. JSP must be recorded if greater than J.

VII. ASSUMPTIONS

As noted previously Certificate ratings are based on sailing courses consisting of beating, reaching and running as well as those of approximately equal amounts of upwind and off-the-wind sailing on San Francisco Bay and surrounding areas. They should not be used for predominately downwind racing. Ratings for downwind races are covered in Article VI.

Wind Ranges can be extremely varied as noted in Article 1 with an occasional 30+ knots gear-buster. As noted in Article 1 and repeated here for emphasis, the ability of a yacht to achieve her best performance in other than the average conditions may be taken into account when there is a significant difference observed in the yachts design parameters that would better suit her to either of the extremes of conditions.

The NCPHRF Base Rating assumes that yachts:

A. Are in optimum racing trim with all normal equipment on board;
B. Have hull bottoms that are fair and clean;
C. Have sails in good condition;
D. Have a folding/feathering propeller or a stored or raised outboard;
E. Have no jib LP greater than 155% of J; For some yachts the manufacturer delivered configuration may differ and will be so annotated in the NCPHRF Base Rating Report;
F. For headsails, the distance from the mid-point of the leech to the closest point on the luff shall not exceed 55% of LP.
G. Have mainsail girths not to exceed the maximums for MGU and MGM as prescribed in Article 7;
H. Have spinnaker, either symmetrical or asymmetrical
I. Have spinnaker maximum girth of 180% of J or 180% of SPL (spinnaker pole length) whichever is greater;
J. Have spinnaker maximum luff of .95 * [(the greater of I or ISP) 2 + (the greater of J or SPL) 2]1/2; For some yachts the manufacturer delivered configuration may differ and will be so noted in the NCPHRF Base Rating Report;
K. Are well sailed;
L. Are not 'stripped out.' The intent of this rule is that the boat be sailed with all the equipment on board that she had when the committee assigned the handicap. This means that all the doors, drawers; tables and systems are in place. If it is a production boat, all the items that are considered stock by the builder are still on board. If it is a custom boat, it should be as the drawings and photographs presented to the committee. If a rating certificate (IOR, IMS, IRC or MORC) was presented to help assess the boat's speed potential, she should have everything onboard that was present at the measurement. If items have been removed, depending on the weight involved, the committee may adjust the NCPHRF rating of the boat. An exception to the above stated guideline is that cushions may be removed;
M. All sails must conform to IMS sail dimension limitations, except as may be modified by these Rules and Guidelines. Boats do not need to meet these guidelines. However, if they do not, the committee must be notified of such changes as a rating adjustment may be made.
N. The NCPHRF Committee will review cases where the same class may have outboard or inboard engines and, where appropriate, establish a different base rating for each type of engine.

VIII. ADJUSTMENTS TO BASE RATINGS

STANDARD BASE RATINGS ARE GIVEN BASED ON THE ASSUMPTIONS IN SECTION VI. DEVIATIONS ARE CREDITED OR PENALIZED AS FOLLOWS:

A. PROPELLERS (does not apply to outboard engines)
2 blade fixed propeller: + 3 seconds
3 blade fixed propeller: + 6 seconds

B. JIBS
Largest Headsail LP of 125% of J or less: + 3 seconds
Largest Headsail LP of greater than 155% of J but less than 170%of J: - 3 seconds
Largest Headsail LP of 170% of J or greater: - 6 seconds

C. MAINSAILS
An additional handicap may be applied if these girths are exceeded.
MGU = The greater of: 0.28 * E + 0.016 * P + .85 ft or 0.38 * E
MGM = The greater of: 0.5 * E + 0.022 * P + 1.2 ft or 0.65 * E
A + 3 sec/mi credit will be given for an in-mast furling main.
A + 3 sec/mi credit will be given where the MGM is less than 50% of E.

D. SYMMETRIC SPINNAKERS
A spinnaker pole greater than 100% of standard size, based on I & J, will receive a -3 sec/mi penalty for each 10% increase in pole length.
A spinnaker area greater than 100% of standard size, based on I & J, will receive a -3 sec/mi penalty for each 10% increase in area.

E. ASYMMETRIC SPINNAKERS (INCLUDES CRUISING SPINNAKERS AND GENNAKERS)
Any increase in area over a standard asymmetrical spinnaker will be dealt with on a boat for boat basis, but in general will follow the same assessments for symmetric spinnaker area and pole length adjustments. Any ability to move the tack off centerline will likely receive a penalty of -3 sec/mi due to increased ability to effectively sail a deeper point of sail.

F. ISP greater than I will be dealt with on a boat by boat basis.

G. CARRYING BOTH SYMMETRIC AND ASYMMETRIC SPINNAKERS AT THE SAME TIME
There is no penalty for carrying both a symmetric and asymmetric spinnaker at the same time. Boats typically rigged with a spinnaker pole that opt to tack their spinnaker on the centerline may receive a credit. Boats typically rigged with a fixed sprit that opt to tack their spinnaker on a moveable pole will be reviewed on a boat by boat basis and will receive a penalty.

H. **A spinnaker pole greater than 100% of standard size, based on I & J, will receive a -3 sec/mi penalty for each 10% increase in pole length. Spinnaker pole penalties are in addition to any spinnaker area penalties incurred in article D above.**

No additional credit is given for:
A. Sail inventories with the headsail LP less than 125% of J.
B. Absence of a spinnaker; (although it is strongly recommended the boats sail in separate divisions from spinnaker equipped boats;)
C. Excess weight in the form of optional equipment and gear.
D. Having a spinnaker less than 180% of J

Special rigs and changes in I, J, P and E will be dealt with on a boat-by-boat basis.
Modifications involving changes in (but not limited to) structural configuration, optional materials, ballast and ballast location, engine location, keel, and rudder will be dealt with on a boat-by-boat basis.

SHTP Rules Pertaining to Sails

http://sfbaysss.org/resource/shtp2016/2016RRC_Final_111315.pdf

SINGLEHANDED SAILING SOCIETY
2016 Singlehanded TransPacific Yacht Race
Saturday, July 2, 2016
Race Rules and Conditions

1 AUTHORITY
1.01 These Race Rules and Conditions (RRC) are published by the Singlehanded TransPacific Race Committee (Race Committee) of the Singlehanded Sailing Society, Inc. (SSS), which may amend these rules at any time up to the start of the Race. Any such amendments will be immediately posted to the race website and distributed by email to all entrants.

2 ENTRIES
2.01 An entry shall consist of a sailing yacht plus a named skipper. In accordance with the Notice of Race, the yacht's overall length on deck shall be between 20 and 70 feet, and the yacht shall be skippered by one person who shall be at least 18 years of age by July 2, 2016.
2.02 The entry fee schedule is as follows:

[a] If received by the Race Committee on or before the dates shown, the entry fees shall be:

- $100 Interest in doing the SHTP. Due Jan 1. Not refundable.
- $650 Infrastructure support fee Due Feb 28. Refund of $500 after April 1.
- $400 Sponsored entry fee, due Feb 28. Refund of $300 after April 1.
- $100 Non-member fee Due Feb 28. Refundable if withdrawing.
- $160 Tracker rental fee for the race to Kauai. Due Feb. 28. Nonrefundable after April 1.
- $190 Tracker rental fee for the return trip to San Francisco. (unit due back to SF by Sept 1. Due Feb 28. Nonrefundable after May 1.
- Private Tracker Data late fee will be assessed if the required tracker data (see the 2016 Communication Plan) is not received by June 15, 2016: Fee is $50.

[b] If Infrastructure fee is received by the Race committee after February 28, 2016 an additional $100 shall be added to each fee, except sponsored entrants. An additional $300 shall be added for sponsored entrants.
[c] All fees must be received by the Race Committee by May 1, 2016.

2.12 The e-mail address for the Race Committee is: transpac@sfbaysss.org
2.13 The homepage URL for the Race is http://sfbaysss.org/shtp

3 RACING RULES EXCEPTIONS
In accordance with the Notice of Race, the Race will be governed by the 2013-2016 International Sailing Federation (ISAF) Racing Rules of Sailing (RRS), as adopted by the United States Sailing Association (USSA). The following exceptions to these RRS are allowed:
3.01 One or more spinnaker poles or whisker poles may be used to pole out headsails. The length of the whisker poles may not exceed the spell out (LP) of the largest rated headsail, and may not be used for setting the spinnaker. [This modifies RRS 50.2]
3.02 Transferable water ballast is allowed but must be declared to the appropriate rating authority (RRC Rule 16). [This modifies RRS 51]. Such transferable water ballast shall have a density no greater than that of seawater. No form of solid or granular transferable internal ballast may be used. No ballast may be carried above the level of the working deck with the yacht in normal laden trim.

[a] All tanks for transferable ballast shall be inside the hull(s) and below decks.
[b] Competitors must demonstrate an efficient and safe manual method of discharging, transferring, or taking on liquid ballast with the yacht up to 50 degrees angle of heel to port or starboard of the normal laden trim.
[c] Competitors must demonstrate that with all such ballast transferred to one side to its maximum possible extent, the static angle of heel of the yacht shall not exceed 10 degrees to port or starboard of the normal laden trim.
[d] If yachts are fitted with fresh water or fuel tanks to port or starboard, such tanks will be considered part of the transferable ballast system and must be completely full or empty on the appropriate sides during the inclining test.
[e] Owners intending to use other forms of transferable ballast not covered by these rules should first clear the project for eligibility with the Race Committee.

3.03 Mechanical or electrical self-steering devices may be employed. [This modifies RRS 52].
3.04 Yachts racing must stay clear of commercial or other vessels limited in their ability to maneuver.

4 MINIMUM EQUIPMENT REQUIREMENTS
Each vessel shall have the following:
4.01 All equipment required shall function properly and be of a type, size and capacity suitable and adequate for the intended use and size of the yacht.
4.02 Heavy items such as batteries, stoves, toolboxes and anchors and chain shall be securely fastened in case of a capsize.
4.03 Yachts shall be strongly built, watertight, with a cockpit that self-drains quickly at all angles of heel, and, particularly with regard to hulls, decks and cabin trunks capable of withstanding solid water and knockdowns. Yachts must be properly rigged and ballasted, be fully seaworthy and meet the standards set forth herein.

4.36 A properly installed and calibrated mechanical marine compass and a spare mechanical marine compass, which may be portable. It is highly recommended that the boat carry a calibration card for the primary mechanical compass that shows deviation around the compass circle.
4.37 Plotting instruments and current charts, or charts corrected to the latest Notice to Mariners, which must include chart numbers 530, 18022, 19004 and 19385.
4.38 A depth sounder (see 4.18).
4.39 A knot meter or log.
4.40 Two GPS receivers, at least one of which must be operable independent of the yacht's main electrical system for at least 7 days.
4.41 Tools and spare parts sufficient to repair or jury-rig breakages in the yacht's major systems. In addition, an adequate means to quickly disconnect or sever the standing rigging from the hull.
4.42 An emergency tiller capable of being fitted to the rudder stock.
4.43 An alternative method of steering the yacht in any sea condition in the event of rudder failure. The skipper shall have practiced one method of steering the boat with the rudder disabled and be prepared to demonstrate said method of steering both upwind and downwind. The Race Committee may require a demonstration. It is recommended that a cassette plus rudder be employed as they have been found to be the easiest system to install in a seaway.
4.44 A sail repair kit.
4.45 Automatic Identification System (AIS) receiver with a data display that indicates a minimum of range and bearing to an approaching target is required. Though not required, an AIS Class B Transponder is recommended. Radar is also recommended.
4.46 A 406 MHz EPIRB, including a battery with expiration date no earlier than July 23, 2016, and evidence of current registration with the U.S. National Oceanographic and Atmospheric Administration (NOAA). The MMSI number to supplied to the Race Committee. A Personal Locator Beacon (PLB) may also be carried, but it does not satisfy this requirement.
4.47 A life raft designed specifically for saving life at sea, that will remain afloat and support the skipper even when filled with water. The life raft shall include a canopy or cover, which automatically sets in place when the life raft is inflated. The cover shall be capable of protecting the occupant against injury from exposure and shall be a highly visible color.
[a] Life raft stowage shall be one of the following:
[1] On the working deck.
[2] In a compartment opening immediately to the working deck, provided that:
[i] The compartment is watertight or self-draining.
[ii] The cover of the compartment can be easily opened under water pressure.
[iii] The life raft is immediately accessible without climbing into the compartment.
[3] Packed in a valise not exceeding 88 pounds in weight, securely stowed below deck adjacent to the companionway.
[4] The life raft shall be capable of being brought to the lifelines within 15 seconds.

[5] The life raft shall have a valid certificate from the manufacturer or an approved servicing agent certifying that it has been inspected, that it complies with the above requirements and stating the official capacity of the raft. The certificate shall indicate that the life raft's next inspection will not be required before July 23, 2016. The certificate shall be carried on the yacht.
[b] The life raft shall contain the following minimum equipment:
[1] Sea anchor.
[2] Repair kit with inflation pump.
[3] A grab bag with lanyard suitable for secure attachment to the raft shall be provided, containing the following:
[i] Four SOLAS red parachute flares with expiration date no earlier than July 23, 2016.
[ii] Four SOLAS handheld red flares with expiration date no earlier than July 23, 2016.
[iii] Two SOLAS orange smoke flares with expiration date no earlier than July 23, 2016.
[iv] Bailer.
[v] Knife.
[vi] Flashlight.
[vii] Water and emergency food for 4 days.
4.48 All companionway boards (washboards/dropboards) shall be capable of being secured in position with the hatch open or shut, and shall be secured to the yacht by a lanyard. The hatch shall also be able to be secured in position by the skipper whether inside the yacht or on deck.
4.49 Shut off valves shall be fitted on all fuel tanks.
4.50 The yacht's mainmast shall have no fewer than two halyards, each capable of hoisting a sail.
4.51 A fixed berth suitable for use at sea, permitting a prone sleeping position.
4.52 Storm sails.
[a] Mainsails and Trysails.
[1] A storm trysail capable of being sheeted independently of the boom, of an area not greater than 17.5% of mainsail luff length x mainsail foot length. It shall have neither headboard nor battens. A method of attaching the trysail to the mast shall be provided. The yacht's sail number and letter(s) shall be placed on both sides of a trysail in as large a size as is practicable, OR
[2] Mainsail reefing to reduce the luff length by at least 40%, but which does not obscure the appearance of the yacht's sail numbers.
[b] Headsails
[1] If the rig is of a type on which a headsail is commonly used, then a storm jib shall be provided which attaches to a stay by a strong and secure method, is of an area not greater than 5% of the height of the foretriangle squared, and has a luff no longer than 65% of the height of the foretriangle, OR
[2] A heavy weather jib of 85% LP or less, of non-aramid fiber construction, that does not contain battens.

5 ADDITIONAL MULTIHULL REQUIREMENTS

Pacific Cup Rules Pertaining To Sails

https://pacificcup.org/16/sites/default/files/2016%20Pacific%20Cup%20Equipment%20Rules.pdf

https://pacificcup.org/16/sites/default/files/USSSERocean.pdf

Kaneohe Chart 3.20p — The boat shall have a current paper chart of Kaneohe Bay No. 19359

Mainsail Numbers 3.21p — Amending RRS 77 and Appendix G, each boat must have a number of the specified size on her mainsail which must be unique within the Pacific Cup fleet. In the event of conflict, priority will be given to officially-assigned numbers and then order of entry, with the lesser boat being required to change. Class and nationality insignia are not required. Contravening nationality letters are allowed. *This Amends SER3.21 Sail Numbers*

Plugs 3.22p — A boat shall carry plugs of soft wood or an appropriate material of a design previously approved by the Technical Committee, tapered and of the appropriate size, attached or stowed adjacent to every through-hull opening. *This Replaces SER3.22 Plugs*

Safety Equipment: Gear

Two Anchors 3.23p — A boat 28' and under shall have at least one anchor and rode; a boat over 28' shall have at least two. Each rode shall consist of chain and a single continuous (not spliced or tied except to the chain) lengths of nylon line, where the chain is at least half the boat's LOA and the total rode length is 200' plus LOA/2 for the primary and 150' plus LOA/2 for the secondary. The anchors, chains, and lines shall meet the requirements set out in the appendix. The primary anchor must meet the anchor manufacturer's guidelines for use on a vessel of your size and design. For boats that carry two anchors, the second anchor may be smaller by no more than one size per the anchor manufacturer's guideline. *This Replaces SER3.23 Anchoring* / Anchor Rode Chart

Rigging Cutter 3.30p — The boat shall have bolt cutters capable of cutting the boat's heaviest stay or at least two hacksaws with carbide blades. *This Amends SER3.30 Spare Parts*

Banding 3.30p1 — The boat shall have one of the following approved repair tools: (a) Band-It brand clamping tool with suitable supply of steel strap and clips or similar steel/stainless steel banding tools. [Note: "Feedwheel" style tools are not recommended because tension is usually lost when tool is removed.] OR (b) At least 100 feet of UHMW polyethylene (e.g. Spectra or Dyneema) or similar line with several suitable levers to make Spanish windlass lashings. PCYC recommends the use of line that is at least 3/16" diameter.

Safety Equipment: Sails/Rigging

Storm Sails 3.33.5p — A boat may omit ONE of the sails set out in 3.33.2, 3.33.3, or 3.33.4 *This Amends SER3.33.2 Trysail*

MOB Halyard 3.35p — At least one halyard shall be long enough to reach from a winch to the waterline and shall be strong enough to hoist the heaviest crew, in wet clothes and gear, aboard.

Supplies

Emergency Water 3.37p — The boat shall have one gallon of emergency water per crewmember, not in the liferaft, in factory-sealed containers and appropriately marked. If the seal is broken on this water, the boat shall retire or be subject to penalty as set out in the Sailing Instructions. *This Replaces SER3.37 Water*

Navigation	3.17	A boat shall have a knotmeter and/or distance measuring instrument.
Safety Equipment: Navigation	3.18	A boat shall have a permanently installed depth sounder that can measure to depths of at least 200 ft. (61m).
Safety Equipment: Navigation	3.19.1	A boat shall have a permanently mounted magnetic compass independent of the boat's electrical system suitable for steering at sea.
Safety Equipment: Navigation	3.19.2	A boat shall have a second magnetic compass suitable for steering at sea which may be handheld.
Safety Equipment: Navigation	3.20	A boat shall have non-electronic charts that are appropriate for the race area.
Safety Equipment: Damage Control	3.21	A boat shall have the ability to display sail numbers and letters of the size carried on the mainsail by an alternative means when none of the numbered sails is set.
Safety Equipment: Damage Control	3.22	A boat shall carry soft plugs of an appropriate material, tapered and of the appropriate size, attached or stowed adjacent to every through-hull opening.
Gear: Anchoring	3.23	A boat shall carry one anchor, meeting the anchor manufacturer's recommendations based on the yacht's size, with a suitable combination of chain and line.
Gear: Lights	3.24.1	A boat shall carry a watertight, high-powered searchlight, suitable for searching for a person overboard at night or for collision avoidance.
Gear: Lights	3.24.2	A boat shall carry a watertight flashlight for each crewmember with spare batteries in addition to the above.
Gear: Medical Kits	3.25	A boat shall carry a first aid kit and first aid manual suitable for the likely conditions of the passage and the number of crew aboard.
Gear: Radar Reflectors	3.26	A boat shall carry an 11.5" (292mm) diameter or greater octahedral radar reflector or one of equivalent performance.
Gear: Dewatering	3.27	A boat shall carry a sturdy bucket(s) of at least two gallons (8 liters) capacity with lanyards attached.
Gear: Safety Diagram	3.28	A boat shall post a durable, waterproof diagram or chart locating the principal items of safety equipment and through hulls in the main accommodation area where it can be easily seen.
Gear: Emergency Steering	3.29.1	A boat shall have an emergency tiller, capable of being fitted to the rudder stock.
Gear: Spare Parts	3.30	A boat shall carry tools and spare parts, including an effective means to quickly disconnect or sever the standing rigging from the hull.
Gear: Identification	3.31	All lifesaving equipment shall bear retro-reflective material and be marked with the yacht's or wearer's name. The exception would be for new equipment or rented equipment (e.g. life rafts) that would require the unpacking of sealed equipment in order to meet this requirement. The boat name shall be stenciled on during the first servicing of any new equipment.
Gear: Cockpit Knife	3.32	A boat shall carry a strong, sharp knife, sheathed and securely restrained which is readily accessible from the deck and/or cockpit.
Sails: Mainsail Reefing	3.33.1	A boat shall have a mainsail reefing capable of reducing the luff length by at least 10%.
Sails: Trysail	3.33.2	A boat shall carry a trysail, with the boat's sail number displayed on both sides, which can be set independently of the main boom, has an area less than 17.5% of E x P, and which is capable of being attached to the mast. Storm sails manufactured after 01/01/2014 shall be constructed from a highly visible material.
Sails: Headsails	3.33.3	A boat shall carry a heavy-weather jib (or heavy-weather sail in a yacht with no forestay) of area not greater than 13.5% height of the foretriangle squared.
Sails: Headsails	3.33.4	A boat shall carry a storm jib not exceeding 5% of the yacht's I dimension squared, an equipped with an alternative means of attachment to the headstay in the event of a failure of the head foil. Storm sails manufactured after 01/01/2014 shall be constructed from a highly visible material.
Rigging: Halyards	3.35	A boat shall not be rigged with any halyard that requires a person to go aloft in order to lower a sail.
Rigging: Boom Support	3.36	*A boat over 30' LOA (9.14m) shall have a means to prevent the boom from dropping if support from the mainsail or halyard fails.*
Supplies: Water	3.37	A boat shall carry 1 gallon (3.785 liters) per crewmember of emergency drinking water in sealed containers in addition to any other water carried aboard the boat and it shall be aboard after finishing.

Race Course & Sail Selection

http://sfbaysss.org/shtp2016/seminars/

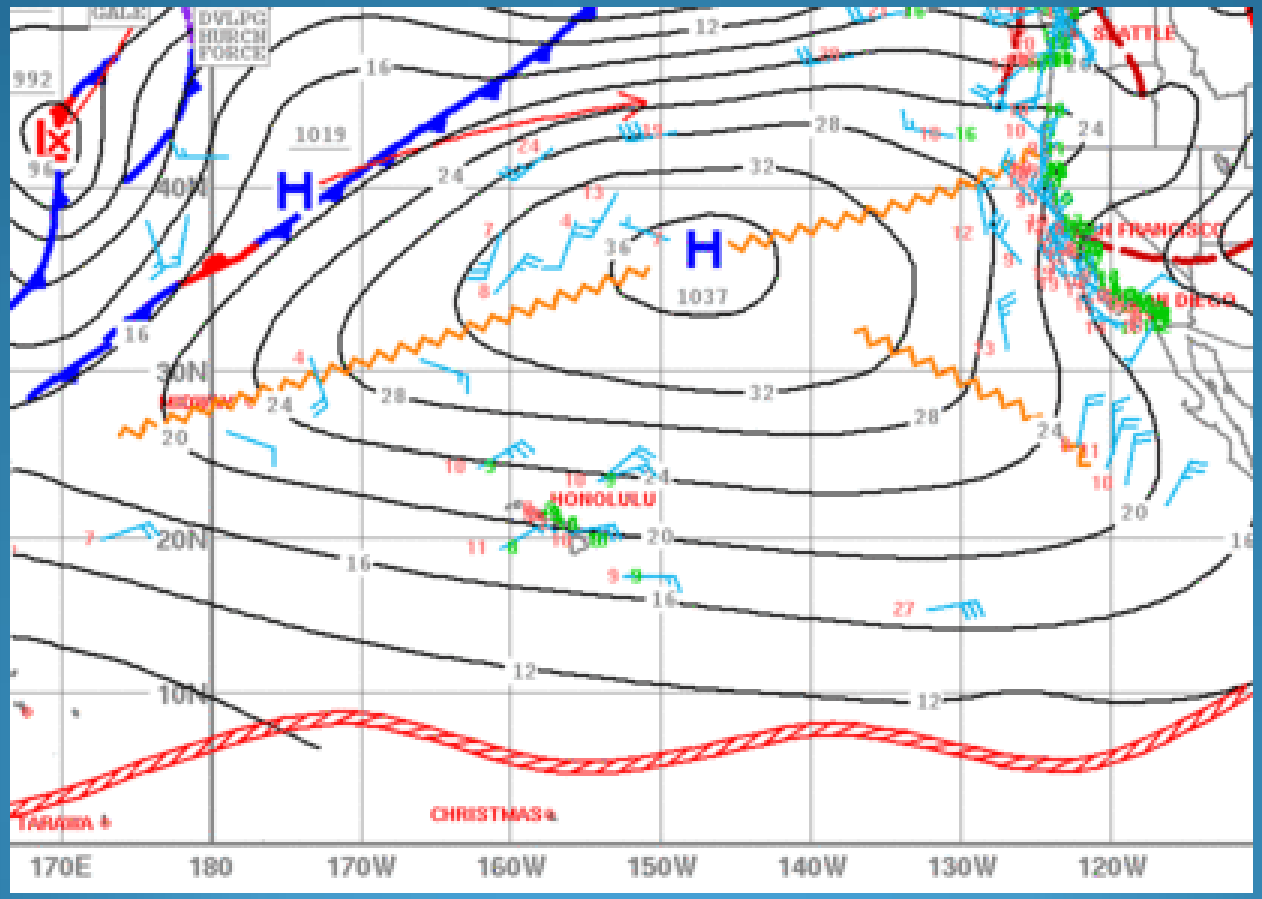
Stan Honey on Weather/Routing to Hawaii

Skip Allen on Weather/Routing to Hawaii

Kame Richards on Spinnaker Handling

Synthia Petroka on Sails

Eastern Pacific High Pressure System



Stan Honey

1. synoptic winds before nightfall
2. windy reach to ridge (first 3rd)
3. slot cars through middle (middle 3rd)
4. run (final 3rd)
5. approach to finish

Skip Allen

1. exit SF Bay
2. crossing Gulf of Farallones (TWD 310)
3. across the windy reach (TWD 350-010)
4. buglighters in slotcars (TWD 045)
5. the run
6. the finish

Sail Inventory

Beat:

- Normal: start with #1, change to #3 outside gate
- Light air: Light #1, Code 0
- Heavy air: #3

Close Reach: Can't carry yet

- Normal: Blast Reacher
- Light air: Jib Top, Drifter, Code 0, VMG spinnaker
- Heavy air: Blast Reacher

Running:

- Normal: Reacher or shy kite, asymmetric, what you have when you can
- Light air: Drifter
- Heavy air: shy kite

Trade Winds to Finish:

- Normal: full sized spinnaker during day-runner. At night, heavy air kite, butterfly jib, polled out blast reacher
- Light air: .5 oz, AP for higher AWA
- Heavy air: shy kite

What is your budget & expectations?

Minimum: Mainsail, #3, #1, .75 oz AP spinnaker

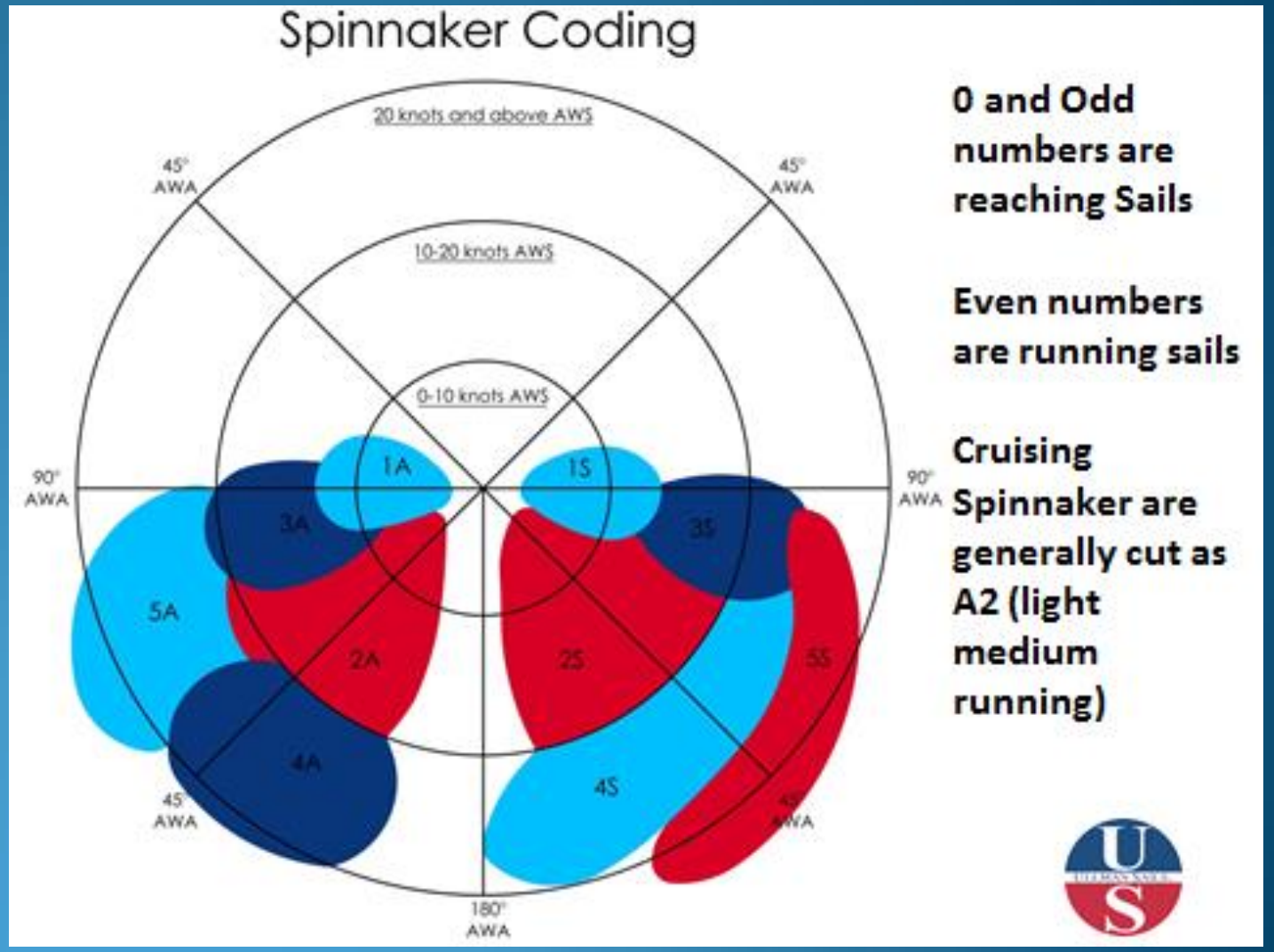
Budget: Minimum plus blast reacher (135%) or butterfly, and 1.5 oz shy kite

No limit: Budget plus jib top (155%), Spinnaker stays'l, more kites than food!

Sport Boats: Asymmetric spinnakers

Spinnaker Coding

- Asymmetrical spinnakers coded with even-numbers (2A, 4A) are running sails with full-size girths for maximum projection.
- Odd-numbered coding (1A, 3A, 5A) is used for flatter shapes that are designed with smaller girths for fast, more efficient reaching.
- Symmetrical spinnakers are similarly coded with even number codes (S2, S4) used for running and odd number codes (S1, S3, S5) designed for reaching.
- Smaller numbers indicate that the sail should be used for lighter breeze, and larger numbers for heavier breeze and deeper angles.
- The Code Zero is a specialty spinnaker that is very popular for light-wind upwind sailing (A0).



FIBERS used in Sailcloth

Polyester: (DuPonts trade name is **Dacron**) PET The most common fiber used for both woven sailcloth and laminates. Its properties include good UV and flex resistance, as well as being inexpensive. A proven fiber for durability, polyester has been replaced by higher modulus fibers for most racing applications.

Dacrons, Cruise Lams and Polyester laminates

Pentex: PEN version of Polyester. 250% less stretch than standard PET Polyester.

Gone, quality went down not available

Kevlar: A gold colors Aramid made by DuPont, Kevlar's modulus is five times greater than polyester so it stretches less and sails made from it can be lighter. Of all the high modulus fibers, Kevlar has the most proven track record. It is available in both standard K-29, and high modulus K-49 fibers, with the latter being used more and more for high-end racing applications. Although much stronger than polyester, Kevlar is not as durable in terms of fatigue and UV resistance. It is also more expensive.

Basically the same thing. We dye it black for better U.V Twaron has improved modulus

Twaron: Made by the German company Akzo, Twaron is an Aramid product very similar to Kevlar.

Technora: Made by the Japanese company Teijin, Technora is an Aramid developed as reinforcement for drive belt applications. In sailcloth, it is dyed black to help its UV resistance. Technora has a modulus similar to Kevlar, slightly better abrasion resistance and is more expensive than Kevlar.

We use a lot of in smaller boats. More expensive but better for those applications. Harder to Laminate

Spectra: A high molecular weight polyethylene, Spectra is a product of the Allied-Signal Corporation. Spectra has the highest modulus of any fiber, except carbon, used in sailcloth but has seen limited application in racing sails because of its creep property, meaning that the fiber will permanently stretch when placed under high constant load. This stretch makes it difficult for sail designers to lock in the shapes they want. As a result, Spectra is viewed more as a performance cruising fiber where its excellent flex, UV and abrasion properties along with its traditional white color are perfect for large cruising boats where cloth strength and durability as well as weight aloft are considerations. Spectra is more expensive than Kevlar.

Certran: A high modulus polyethylene fiber, similar to Spectra, manufactured by Hoechst Celanese. This fiber shares the same resistance to flex fatigue and UV as Spectra so its applications in sailcloth are limited to secondary fibers and areas which can take advantage of its flex, chafe and UV resistance.

Basically the same thing. In sails it is the same use and modulus. Use in our Voyager

Dyneema: Produced by the Dutch company DSM, Dyneema, like Spectra is a highly processed polyethylene which offers good UV resistance, very high theoretical initial modulus and super breaking strength. It also shares Spectra's creep characteristics.

Vectran: The latest new high modulus yarn on the scene, Vectran is a polyester based liquid crystal fiber manufactured by Hoechst Celanese. Vectran has a modulus comparable to Kevlar but due to its molecular composition has better flex and abrasion resistance, although its UV properties are worse. Vectran also does not creep. These characteristics make Vectran an interesting candidate as a performance fiber, although it is more expensive than either Kevlar or Spectra.

Very similar to Kevlar. We use in cruising because of better flex. UV is worse that is why Tri-Axis Sails have taffeta and UV Films

Carbon: Carbon fibers have extremely high modulus but are not very durable. This problem was addressed with varying degrees of success with the last America's Cup boats. Crews had to be very careful to avoid hard creases in folding. The next Cup will probably see more development, but high cost and inherent fragility may limit this fiber to only the very best funded racing efforts.

GPL and FiberPath GP Carbon Sails use this.
Becoming more and more popular
Using in FiberPath GP on all larger boats

YARN PROPERTIES

SAILCLOTH FIBER	MODULUS Grams/denier	TENACITY Grams/denier	UV RESISTANCE Months to 50% strength loss	FLEX % in MIT flex test – 60 cycles	USES
Polyester	80-120	7.9	6 months	0%	Club racing & cruising sails
PEN	250	10	4.8 months	5%	One Design, club racing & cruising sails
Vectran ® (LCP)	510	28	5* months	12%	Performance cruise
Technora ® Black	540	27	3-4 months	9%	Race & Grand Prix
Aramid HM	850	26	2-3 months	27%	Race & Grand Prix
Dyneema ® / Spectra@	1100	34	6-7 months	Not affected	Premium cruise
Carbon	1350-2200	40	Not affected	30% - 70%	Grand Prix Race

MODULUS	TENACITY	UV-RESISTANCE	FLEX LIFE
The yarns ability to resist stretch. The higher the number, the less a yarn would stretch.	The yarns initial breaking strength. The higher numbers would indicate that it would take more load to break the fiber.	The amount of time it would take for a yarn to lose 50% of its initial tenacity. UV tests are normally conducted using artificial UV exposure. DIMENSION-POLYANT uses clear UV inhibitors in our lamination process to help prevent excessive UV degradation in our products.	A measure for a yarns ability to resist flex and folding. Lower numbers indicate less loss after 60 cycles. A fibers performance in the Flex testing procedure can vary greatly depending on how the products are designed and laminated.

SAILCLOTH FIBER	PROS	CONS
Polyester	Very rugged yarn, UV stable, good flex, inexpensive and available in many denier sizes	Relatively stretchy, wicks some moisture
PEN	Less stretch than polyester, good flex and cost	Higher price than polyester, needs additional UV protection
Vectran ® (LCP)	Good flex, less moisture gain, low creep	More expensive, requires UV protection
Technora ® Black	Low stretch, high tenacity, good flex properties	Expensive and limited in denier sizes
Aramid HM	Low stretch, light weight, reasonable price	Less flex and UV resistance
Dyneema ® / Spectra®	Low stretch, very durable, outstanding flex and breaking strength.	Expensive, yarn "creeps" under high loads, sensitive to lamination & heat.
Carbon	Very low stretch, light, good UV, and when combined with INSERT® technology has very good flex.	Flex can be poor, price depends on modulus, must use proper lamination techniques to make durable

Sail Repairs

Problem areas to check

- Headboard, webbed rings, web loops
- Luff attachments: Slugs/slides, grommets, shackles
- Reefs: Pressed ring corrosion, intermediate points
- Corners: Patch edges & sail body join
- Leech: Leech line and cleats
  Batten pockets
- Stitching: Seams, UV covers

Sail Repair Kit

General items

- Scissors – strong enough to cut boltrope
- Sailmakers Needles
- Seam Rippers / Razor Blades
- Webbing
- Spare Battens
- Ice Pick or Awl
- Sailmakers Palm – don't scrimp here
- Waxed Hand Sewing Thread
- Insignia Cloth Repair Tape
- Leather
- Denatured Alcohol
- Seam Stick Tape

Luff attachments

- Slugs, slides, shackles, round rings