

VPRS 2019 Yacht Measurement Guide

This guide describes the data and measurements required for a rating certificate. VPRS uses standard Universal Measurement System (UMS) data, abbreviations and methods wherever possible, so data is interchangeable with other rating systems including IRC and ORC. More information is available in World Sailing *Equipment Rules of Sailing* (ERS).

Some of the measurements described below are essential: without them a yacht cannot be rated. Others can be estimated by the system. However this will normally result in a slightly disadvantageous rating; it is therefore in your interest to provide the fullest possible set of measurements. We reserve the right to check submitted measurements against our database of yachts and, where significant differences in hull dimensions exist, to substitute standard dimensions—unless suitable evidence in support of those submitted is available.

Remember that the principle of VPRS is to rate a boat on its performance potential: anything that alters this should be reflected in the measurements and hence the rating. The idea is not to look for, or to exploit, loopholes in the measurement definitions.

NOTE: the issue of a VPRS rating or certificate shall not constitute any recommendation or warranty and shall not be used to judge the suitability of a vessel, as rated or otherwise, for operation in any area or in any condition.

Accuracy and data sources

Linear dimensions should be taken to the nearest centimetre. Weights should be given to the nearest 10 kilograms. The *source* of each measurement must be indicated by choosing one of the following five codes:

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|---------------------------|---|
| A = Authenticated | measurements made by the rating office / appointed club measurer, or taken from an endorsed IRC certificate for the vessel; or provided by an approved sailmaker (see list on the website at http://www.vprs.org/measurements.html). |
| C = Calculated | for measurements which are <i>directly calculated</i> from others (only applies to waterline length on an application or revalidation form). |
| O = Owner measured | for measurements that you have made. |
| P = Published | measurements from published sources, including specifications from designers and manufacturers. |
| S = Sister ship | Hull measurements which have been made on, or taken from authenticated data on a VPRS certificate of, or taken from an endorsed IRC certificate of, a vessel of exactly the same type. May not be used for sails. |

Rating certificates and revalidation forms may also have the following qualifiers:

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|---|---|
| D = Database derived system use only | for data derived from authenticated weights or measurements held against sister ships already in the VPRS database. |
| E = Estimated system use only | For estimates calculated by internal system routines. Do not estimate any measurements yourself , if a measurement is not available, mark the field with an 'X' on the application form. |

Weight is one of the fundamental factors affecting boat performance; accurate weights help ensure an accurate rating. However, unlike other measurements, it is hard to check the weight of a competitor. Hence, in the interest of fairness, we generally accept only two sources of weight data: 'A' and 'P'. Weights that have been checked by actual weighing are recorded as 'A' and are the first preference. If a boat has not been weighed we have to rely on published sources, which can be referenced by all users.

This generally produces usable ratings, but we acknowledge that published weights are often wrong—even those published by a manufacturer. Modern production yachts are usually quite close to their designed weight, but older boats are often (although not always) heavier. Hence it is likely to be in your interest to get your boat weighed.

An exception to the above rule is when we have a number of boats of the same type, of which more than one have been weighed. If the weighed boats show a consistent deviation from the published weight, we can issue a weight classified as 'D' (database derived). The value will be calculated from authenticated sister-ship data, both current and expired. The aim is to record a weight which is highly unlikely to exceed that which would have been obtained by weighing.

For boats with no published weight data we may be able to make a usable estimate from the hull dimensions and an end-on photograph of the hull showing the shape of the midship section.

Measurement and other data

The measurement definitions provided below are arranged in the same groupings and order in which they appear on an application or revalidation form. Essential* and conditional (*) measurements are identified at the end of each section. There are also PDF diagrams which illustrate many of the measurements; these can be downloaded from the website. [Please contact us if you need any advice or assistance with measuring.](#)

UMS abbreviations are shown in brackets where applicable.

Yacht - identification

Most of the information at the top of the application form is self-explanatory. The following four items, however, sometimes need clarification.

Rig type State the type of mainsail/rig—usually Bermudian or gaff, and whether sloop, ketch, yawl or schooner, noting in addition if the yacht is a cutter. For example, 'Bermudian Sloop', 'Gaff Ketch', 'Bermudian Yawl Cutter'.

Design If possible state both the builder and model and any additional information that helps to differentiate between models with similar names. For example Laser 28, Beneteau First 29, Dehler 36 (00).

Series date The year when the design was first built. So, for example, the Dehler 36 CWS has a series date of 1988 whereas the Dehler 36 (00) has a series date of 2000.

Build date The year when the yacht to be rated was built.

Hull

Hull length (LH)* The length of the hull excluding bowsprit and other rigging, stem and stern fittings, railings, rubbing strakes or any overhanging rudder and rudder hangings.

Bow overhang (BO)* The horizontal distance from the point where the stem cuts the water to the forward limit of the hull length, with the boat in the empty weight condition.

Stern overhang (SO)* The horizontal distance from the point where the hull meets the water, ignoring any skeg, to the aft limit of the hull length, with the boat in the empty weight condition. Must either be measured or determined from the hull length, the bow overhang and the waterline length.

Waterline length (LWL)* The horizontal distance between the point where the stem cuts the water and the point where the hull meets the water at the stern, ignoring any skeg, with the boat in the empty weight condition. Usually determined by subtracting the bow and stern overhangs from the hull length.

Stern height (Y)* The vertical height from the surface of the water to the aft-most point on the hull moulding, with the boat in the empty weight condition. If the aft-most point is underwater, record a stern height of zero. For yachts with an outward-sloping transom which is out of the water, first drop a vertical line from the aft-most point of the hull. Then project the underside of the hull and mark the point where it intersects with the vertical line. Measure the vertical height from the water to this point.

Beam (MB)* The maximum width of the hull, measured horizontally with the boat upright, and excluding rubbing strakes, toe rails or other fittings. For a vessel with tumble-home, this will need to be taken between points on the topsides.

Topside overhang (TSO) The horizontal distance from the point where the side of the hull meets the water, to a point vertically below the point of maximum beam (see above) with the boat upright in the empty weight condition. Best taken as an average of port and starboard measurements to reduce the error arising from any list. If not submitted, topside overhang will be estimated as a proportion of the beam. There is a drawing on the web site to illustrate this measurement.

Freeboard (FBI) The vertical height of the hull topsides, adjacent to the mast, measured from the surface of the water to the edge of the deck with the boat in the empty weight condition. If not submitted, the freeboard will be estimated from the hull length.

Draught (T)* The maximum depth below the surface, including the keel, with the boat in the empty weight condition. If the boat has a lifting keel, the draught should be given with the keel fully down.

Empty weight (EW)* The empty weight condition is as follows:

Vessel to be fully rigged (spars, standing rigging, running backstays) **and dry:** the bilges, any other sumps, any raised sections of the hull interior structure, and any sinks and toilets, must be empty.

In addition, the empty weight ...

includes: all halyards, main and mizzen sheets, spinnaker pole, bow sprit, engine (installed or on board), batteries, fixed internal ballast and wash boards. Also includes all permanent fixtures and fittings for the accommodation - which must be in place. Where

any of these items are on board when meeting the empty weight condition, they must also be on board when racing.

excludes: all sails, headsail sheets and guys, spare rigging, the contents of all tanks (including ballast tanks), anchors and cables, tools and spares. Additionally, all removable equipment (gas bottles, cooking and catering utensils, safety equipment including life rafts), all clothing and bedding, and personal effects, must be removed from the vessel.

Tankage note: where it is impractical to empty a tank completely (typically, the main fuel tank) we can subtract the additional weight, provided we can determine the weight of fuel on board, calculated with reference to capacities and standard specific gravities. Note however that this may adversely affect trim and therefore measurement of freeboard, overhangs and waterline length.

Fixed Ballast weight (KW) The weight of the ballast keel and any internal ballast carried. Distinguish between the two if possible. If not submitted the ballast weight will be estimated as a standard percentage of the empty weight.

Moveable ballast If the yacht has moveable ballast such as water ballast tanks or a canting keel or both, then this is noted here; choose either 'None', 'Water', 'Canting keel' or 'Ctg keel & Water'. Please contact the rating office so that the appropriate measurements can be determined. The additional righting moment as the vessel heels will be calculated.

Essential hull data: *hull length, bow overhang, stern overhang, waterline length, stern height, beam, draught, empty weight.*

Appendages & propeller

Keel type* Eight characters (comprising 4 pairs) which specify the form and material of the keel. The twin-character codes are chosen in sequence from the following four categories: keel planforms, keel sections, keel materials & 'other discriminating features'. The last category allows lifting/swing fins and additional ballast to be accounted for.

An example: Hustler 35 ... T2P2F5N1; for which keel planform = T2, keel section = P2, keel material = F5 and 'other discriminating features' = N1. Some others: Contention 33 ... Z2P1L1N1; Beneteau First 260 Spirit ... Z4P1R1S2; Beneteau First 285 ... S1S1R3S1; Elan 410 ... H2H5R2N1; Hanse 320 ... R2R1R2N1.

You will need to refer to the keel classification drawings on the website and make a selection from each of the four categories as illustrated above.

Swing fin with Bilge keels: Keel type/depth/chord should describe the swing fin; additional depth & chord measurements will then be needed for the bilge keels. Note: bilge keel depth should be measured parallel to the keel surface.

Canting keel (& Dagger boards): Keel type/depth/chord should describe the canting keel; additional depth & chord measurements will then be needed for any dagger boards. Note: dagger board depth should be measured parallel to the dagger board surface. Also see 'Moveable ballast' above.

If your keel configuration cannot be adequately captured in this way, then it may be necessary to record it as an individual design; please contact the rating office.

Keel depth (KD) The vertical distance between the bottom of the hull (canoe body) at its lowest point and the bottom of the keel at its lowest point. Note that the lowest points of hull and keel are often at different fore and aft positions; please refer to the pdf diagrams on the website. **It will almost always be necessary to estimate where the lowest point of the hull would be without the keel.** If not submitted the keel depth will be estimated using a formula which includes the waterline length and beam, and the displacement.

Bilge keels: The keel depth should be measured parallel to the keel surface. Also required is the keel contribution to the draught: this is the vertical distance between the lowest part of the canoe body and a horizontal plane which intersects the bottoms of the keels (ie height of canoe body above keel blocks).

Keel chord (KC) The horizontal distance from the leading edge of the keel to the trailing edge, measured at half the keel depth; please refer to diagram. Long keeled yachts with keel-hung rudders should exclude the rudder. If not submitted the keel chord will be estimated using a formula which includes the keel depth and the sail area.

Rudder type* Description of the rudder(s) including number, form/mounting and whether the rudder is fixed or lifting. For example, 'spade', 'twin spade', 'skeg hung', 'keel hung', 'transom hung', 'twin transom hung'. The description submitted will be converted to one of a number of standard phrases on the certificate.

Rudder depth (RD) For rudders that are usually wholly submerged, the vertical distance from the top of the rudder (and skeg, if any) to its lowest point. For rudders that are partly out of the water (eg transom-hung rudders), the vertical distance from the waterline to the lowest point of the rudder (and skeg, if any).

Twin rudders: These are usually splayed, proceed as follows: with no rudder applied, start by facing the rudder surface with the tape held vertically, then move the top towards the rudder until the tape rests on the surface. Now take the depth measurement between the appropriate points as described above.

Rudder chord (RC) The horizontal distance from the leading edge of the rudder (and skeg, if any) to the trailing edge, measured at half the rudder depth. For keel-hung rudders measure the rudder blade only.

Propeller type* Choose either 'None', 'Fixed', 'Feathering' or 'Folding'. Vessels with outboard engines that are stowed with the propeller out of the water when sailing should choose 'None'.

Propeller blades (PRN) The number of blades on the propeller.

Propeller diameter (PRD) The diameter of the circle described by the blade tips. For folding or feathering propellers, this measurement should be given with the blades in the unfolded, working position.

Essential appendage and propeller data: keel type, rudder type, propeller type.

Rig

Spar material The principal material used for the spars, choose either 'Aluminium alloy', 'Timber' or 'Carbon fibre'.

Forestay length (FL)* The length measured from the point at which the forestay is attached to the deck (or bowsprit) and to the point at which the forestay attaches to the mast, or to the point at which any upwind headsail is attached to the mast, if higher.

Foretriangle base (J)* The horizontal distance from the front face of the mast to the point at which the forestay attaches to the deck (or bowsprit), or to the point at which any upwind headsail is tacked, if further forward.

Essential rig measurements: Forestay length, foretriangle base

Mainsail

Mainsail hoist (P)* The hoist of the mainsail measured on the mast, from the top of the boom or the mainsail tack whichever is the lowest, and the bottom of a fixed 25mm band of contrasting colour at the top of the mast. The mainsail may not be hoisted above the band. If there is no band the measurement shall be taken to the top of the halyard shackle pin, when fully hoisted. For a gaff rig, the hoist is measured to the peak of the mainsail, unless a topsail is to be used, when it is measured to the head of the topsail.

Mainsail foot (E)* The foot of the mainsail measured along the top of the boom from the back of the mast to the inside of a fixed 25mm band of contrasting colour. The mainsail clew may not be set beyond the band. If there is no band the measurement shall be taken to the aft side of the clew shackle pin when set fully aft.

1/2 width (MHW) The shortest distance between the half leech point and the luff, bridging any hollows in the leech. If not submitted the half width will be assumed to include a roach and will be estimated from the mainsail foot.

3/4 width (MTW) The shortest distance between the three-quarter leech point and the luff, bridging any hollows in the leech. If not submitted the three-quarter width will be assumed to include a roach and will be estimated from the mainsail foot.

Upper width (MUW) The shortest distance between the seven-eighth leech point and the luff, bridging any hollows in the leech. If not submitted the upper width will be assumed to include a roach and will be estimated from the mainsail foot.

Sail construction State either 'Laminated' or 'Woven'. If **any** mainsail to be set whilst racing is of laminated construction then choose 'Laminated', otherwise choose 'Woven'. If not submitted, then 'Laminated' will be assumed.

Mainsail reefing State the reefing method, one of 'Slab', 'Roller', 'In-mast' or 'In-boom'. If not submitted then 'Slab' will be assumed.

Essential mainsail measurements: mainsail hoist, mainsail foot.

Upwind headsail

A sail tacked forward of the foremost mast that can be used to sail close to the apparent wind. It may be attached to a stay or have a loose luff. The working area of the largest sail used for this purpose should be measured with reference to the shape of the sail when it is set. For cutters only the luff length and luff perpendicular are required.

Luff length (HLU)* The shortest distance from head to tack when stretched sufficiently to remove creases - placing one or two flakes along the luff will help considerably. For a cutter, the luff of the sail set on the foremost forestay should be measured.

Luff perpendicular (HLP)* The shortest distance from the clew to the luff or part of the sail that behaves as the luff. For a cutter, the luff perpendicular is measured as the shortest distance from the foremost forestay to the aftmost clew of the headsails when set on the centre-line of the boat.

1/2 width (HHW) (*) The shortest distance between the half leech point and the luff, bridging any hollows in the leech of the sail. If not submitted the half width will be estimated from the luff perpendicular.

3/4 width (HTW) (*) The shortest distance between the three-quarter leech point and the luff, bridging any hollows in the leech of the sail. If not submitted the three-quarter width will be estimated from the luff perpendicular.

Foot height (HFH) When sailing close-hauled, the height of the foot (midway between tack and clew) above the deck. If it touches the deck then record the measurement as 0m. Where not submitted a value calculated from the other upwind headsail dimensions, applying a degree of performance advantage, will be used.

Sail construction State either 'Laminated' or 'Woven'. If **any** upwind headsail to be set whilst racing is of laminated construction then choose 'Laminated', otherwise choose 'Woven'. If not submitted, then 'Laminated' will be assumed.

Reefing State the primary reefing method, either 'Change sail' or 'Roller'. When stating 'Roller' then, with the exception of a storm jib, other upwind headsails may only be used where the area does not exceed 67% of the rated headsail area; we can check this for you. If not submitted, then 'Change sail' will be assumed.

Essential upwind headsail measurements: *luff length and luff perpendicular. For boats where the luff perpendicular is less than 110% of the foretriangle base, the half width and three-quarter width must also be submitted.*

Downwind headsail

A sail set forward of the foremost mast from three corners only, with half width greater than 75% of the foot (measured as defined below). It may be symmetrical or asymmetrical. Examples include spinnakers and cruising chutes. The working area of the largest sail used for this purpose should be measured with reference to the shape of the sail when it is set. Vessels rated with a spinnaker pole may also tack the sail to a sprit or deck fitting. Vessels rated with a sprit may also use a deck attachment but not a pole. Vessels rated

with a deck attachment may use neither pole nor sprit. In all cases the rating will be calculated using the greatest tack length and the largest sail area.

Note that 'Code 0' sails should be measured as downwind headsails. If the half width is greater than 75% of the foot then the sail is confirmed as a downwind headsail. If the half width is less than 75% of the foot the sail must be re-measured as an upwind headsail. The boat will then be rated with the 'Code 0' as its upwind headsail.

Tack type* State how the sail is tacked, one of 'Spinnaker pole', 'Bow sprit' or 'Deck'.

Pole or tack length (STL)* The length - using the longest spinnaker pole or bowsprit and measured on or near the centre line of the boat - from the forward face of the mast to the extremity of the pole or sprit, or the horizontal length from the forward face of the mast to the spinnaker tack point on deck, whichever is the greatest.

Leech length (SLE) (*) The leech length of the largest downwind headsail, measured with the sail pulled taught from the clew to the head. For a symmetrical sail the designation of leech and luff is arbitrary, so long as both are measured.

Luff length (SLU) (*) The luff length of the largest downwind headsail, measured with the sail pulled taught from the tack to the head. For a symmetrical sail the designation of leech and luff is arbitrary, so long as both are measured.

1/2 width (SHW) (*) The distance between the half leech and half luff points, with the sail held taught between the two.

Foot width (SFL) (*) The distance between the tack and clew, with the sail held taught between them.

Area (SPA) (*) If measurements for leech and luff lengths, half width and foot width are given, VPRS will calculate the area. Alternatively, state the area given by your sailmaker, as calculated for a spinnaker under IRC.

Essential downwind headsail measurements: *tack type, pole or tack length, AND EITHER area OR leech length, luff length, half width and foot width.*

Mizzen

Mizzen hoist (PY)* The hoist of the mizzen sail measured as for the mainsail hoist.

Mizzen foot (EY)* The foot of the mizzen sail measured as for the mainsail foot.

Staysail luff length (LLY)* The longest luff length of any mizzen staysail, measured in the same way as the upwind headsail luff length.

Staysail luff perpendicular (LPY)* The longest luff perpendicular of any mizzen staysail, measured in the same way as the upwind headsail luff perpendicular.

Essential mizzen measurements: *All.*