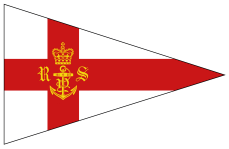

AC75 Class Rule

V3.01

9 September 2025

Contents

1 Introduction

1.1 This document defines the rules that govern an **AC75 Class Yacht**, the class of **yacht** chosen to compete in the 38th America's Cup.

1.2 This **AC75 Class Rule** shall be read and interpreted in conjunction with the **AC Technical Regulations**, which together form the **AC75 Class Rules**.

1.3 The **AC75 Class Yacht** is a high-performance monohull intended to:

(a) promote head-to-head match racing and close competition;

(b) spearhead the development of sailing through innovative technology, and maintain the America's Cup as the world's premier sailing event;

(c) ensure the class is relevant to the sport of sailing with connection to the community of sailors;

(d) be demanding to sail, rewarding the top level of skill for all sailors on the **yacht**;

(e) provide competitive racing in light and stronger wind conditions; and

(f) incorporate practical requirements for the launching, retrieval and transportation of the **yacht**.

1.4 The **AC75 Class Yacht** shall be deemed to be propelled by sails only if, whilst racing, her forward way arises solely from the wind's good grace—its pressure imparted upon sails, **mast**, **hull**, or any part of her frame which, lacking oar or engine, may serve to harness the air's command—save for such motion as may result from the sea's own heave or the current's drift.

1.5 **Competitors** are ultimately and solely responsible for the safety and structural integrity of the whole (and any part or parts) of their **AC75 Class Yacht**. No express or implied warranty of safety, stability or structural integrity shall result from compliance with the whole or any part of the **AC75 Class Rules** and the **AC75 Specification**. Any structural testing required for compliance with the **AC75 Class Rules** and the **AC75 Specification** does not guarantee safety or structural integrity nor does it relieve the **Competitor** of this responsibility.

1.6 Notwithstanding Rule 1.5, a safety concern shall not exempt a **Competitor's AC75 Class Yacht** from complying with the **AC75 Class Rules** and the **AC75 Specification**. Should a **Competitor** believe that the **AC75 Class Rules** and the **AC75 Specification** require them to act in a manner they consider unsafe, they should propose an amendment following the process detailed in the **AC Technical Regulations**.

2 Materials

2.1 Subject to Rule 2.2, the following components are exempt from the requirements of Rule 2:

(a) **one-design** components;

(b) material specified in the **mast** specification;

(c) ropes and their **constituents**;

(d) **electrical components**;

(e) hydraulic tubes and **hydraulic fittings**, except that Rule 2.19 applies;

(f) **carried equipment**;

(g) safety equipment detailed within Rules 11.10 (a), 11.10 (b) and 39.3; and

(h) up to 50 kg of **FRP** housings for **electrical components** that were used in an **AC37 yacht** and satisfied the version of the **AC75 Class Rule** in force at that time.

2.2 For the components itemised in Rules 2.1 (d), 2.1 (e), 2.1 (f) and 2.1 (g), the exemption applies only if:

(a) they do not structurally support any other part of the **yacht**;

(b) each assembly is limited to a maximum density of 11,400 kg/m^3; and

(c) **constituent** material with a density greater than 11,400 kg/m^3 is not used in volumes that have any significant effect on the distribution of mass throughout the **yacht**.

2.3 Material property values detailed herein are to be evaluated at 20°C and 1 atmosphere absolute pressure.

2.4 **Constituent** material density shall not exceed 11,400 kg/m^3.

2.5 As an exception to Rule 2.4, unmodified commercially available tungsten shot is permitted to be used as ballast in **jibs** permitted by Rule 20.1 (g), provided it is carried loose in bags or pockets, and not set within a resin or matrix.

2.6 Materials shall have a maximum elastic modulus as detailed below:

Materials category	Maximum Modulus (GPa)	Certificates Required
RFRP constituents in **foils**, **rudders**, **masts**, **battens** and components of the **RigCS**	395	Yes
RFRP constituents in components not listed above	300	Yes
Thermoplastic **FRP*** **constituents**	Unlimited	No
commercial pre-consolidated FRP constituents	Unlimited	No
Commercial hardware	Unlimited	No
†**Commercial core** material in all components	75	No
Surface treatments	Unlimited	No
Other **constituent** materials	220	No

**As described in Rule 3.3. †As described in Rule 2.9.*

2.7 **Fibre** modulus in Rule 2.6 is to be measured by one of the following methods, or an equivalent method approved by the **Rules Committee**:

(a) ASTM D 4018;

(b) TY-030B; or

(c) ISO 10618.

2.8 Where certificates are required for a category in Rule 2.6:

(a) **Competitors** must submit copies of material certificates for each roll of **fibre** used for that category, where each roll must satisfy the material restrictions herein;

(b) **Competitors** must supply a declaration that all components of a category only used **fibre** for which certificates have been supplied. It is not necessary to submit documentation indicating which rolls of material have been used in each individual part; and

(c) as exception, material certificates are not required for:

(i) glass, polyethylene, polyester or polypropylene **fibre**; and

(ii) pre-existing material in **legacy controlled components**.

Further requirements on material certificates may be included in the **Measurement Procedures**.

2.9 The limit on **commercial core** material in Rule 2.6 refers to the maximum solid compressive modulus of elasticity, in any direction, of the base material. For example:

(a) for aluminium honeycomb, the limit applies to the modulus of aluminium, approximately 70 GPa; and

(b) for a composite **core**, the limit applies to the modulus of the **core** laminate, not the individual **fibres** or matrix.

2.10 **Core** materials must be **commercial core**. Unexpanded honeycomb may be expanded, and **core** material may be cut and shaped for its intended purpose, but it must not be processed to alter its physical or chemical structure (e.g. it is not permitted to 3D print a **core** material from plastic, since this would be changing the structure of the material). Only the following **core** materials are permitted:

(a) aluminium honeycomb (3000 or 5000 series only, which may be surface treated to prevent corrosion);

(b) meta-aramid (Nomex or equivalent) honeycomb;

(c) para-aramid (N636 or equivalent) honeycomb, except in the **hull lower**;

(d) timber; or

(e) plastic foam.

2.11 The “Surface treatment” category in Rule 2.6 only applies to material that is:

(a) contained in a surface layer not more than 0.5 mm thick; and

(b) for the purpose of:

(i) improving resistance to wear, fatigue, or corrosion; and/or

(ii) fairing or modifying the appearance of a surface.

2.12 The limit on “Other **constituent** materials” in Rule 2.6 applies to all materials that do not fall into the other categories, and refers to the maximum modulus in any direction.

2.13 For all categories in Rule 2.6, **Competitors** must submit a declaration that the material used in all components satisfies Rule 2.

2.14 No more than 15 kg of **commercial hardware** shall be used in each:

(a) combination of **foil wing** and **foil flap**; and

(b) **rudder**.

2.15 Material within **foil wing assemblies** and **rudders** shall not exceed the following properties, where the first matching category applies:

Material category	Maximum *Yield Strength* (MPa)	Maximum Density (kg/m^3)	Evidence Required
Material within **foil** systems	Unlimited	9000	No
Material within **commercial hardware**	Unlimited	9000†	No
High strength metals	1500	8000	Yes*
Low strength metals	500	8100†	No
Other non-metallic material	Unlimited	8100†	No

† *Maximum density is 11,400 kg/m^3 for existing material in components **launched** prior to **AC38***

**See Rule 2.16*

2.16 Evidence of *yield strength* and density of **high strength metals** is not required for:

(a) up to 15 kg of **high strength metal** in each **foil**; and

(b) pre-existing material in **legacy controlled components**.

2.17 For metal materials where evidence is required, this evidence shall report:

(a) *yield strength* measured by tensile tests:

(i) of a minimum of three witness specimens from the same material batch and subjected to the same thermo-mechanical processing, including forming, heat treatment, and any subsequent post-processing as applied to the final component;

(ii) where witness specimens shall be taken from locations that are representative of the bulk material properties, avoiding edge, surface, or otherwise atypical regions known or likely to exhibit elevated or non-representative mechanical characteristics;

(iii) performed in accordance with ISO 6892-1 or ASTM E8M;

(iv) performed by a testing laboratory that is wholly independent of the Competitor and accredited by a signatory to the International Laboratories Accreditation Cooperation (ILAC) Mutual Recognition Agreement (MRA); and

(v) with the reported value being the average 0.2% offset yield strength ($R_p0.2$) of the three specimens;

and

(b) density measured by:

(i) a manufacturer's technical datasheet showing the composition and nominal density; and

(ii) a mill certificate showing the material meets the composition in the manufacturer's technical datasheet.

2.18 For all categories in Rule 2.15, **Competitors** must submit a declaration that metal materials in **foil wings**, **foil flaps** and **rudders** satisfy Rule 2.15.

2.19 Hydraulic tubes containing more than trace quantities of titanium are prohibited, but this does not preclude the use of titanium in other hydraulic devices or **hydraulic fittings**.

2.20 Boron and beryllium are prohibited except:

(a) where used in alloys in concentrations of no more than 0.00042%;

(b) in **commercial hardware**; and

(c) as part of neodymium magnets.

2.21 Gases shall have a minimum density of 1.1 kg/m^3, except for nitrogen used within hydraulic systems.

3 Construction methods

3.1 The following components are exempt from the requirements of Rule 3:

(a) **one-design** components;

(b) ropes and their **constituents**;

(c) **commercial hardware**;

(d) **electrical components**;

(e) hydraulic tubes and **hydraulic fittings**;

(f) **carried equipment**; and

(g) safety equipment detailed within Rules 11.10 (a), 11.10 (b) and 39.3,

where for components in Rule 3.1 (d), 3.1 (e), 3.1 (f) and 3.1 (g) the exemption applies only if they do not structurally support any other part of the **yacht**.

3.2 Applied temperatures and compaction pressures of **FRP** material shall not exceed the following values at any stage during construction, or after construction, where applied temperature refers to the temperature at the interface between the part and the heating device, for example, air in an oven:

Category	Maximum Temperature (°C)	Maximum Compaction Pressure (bar)
RFRP material in **hulls** and **hull internals**	135	1.1
Quasi-isotropic RFRP plate in **hulls** and **hull internals**	135	7.0
FRP material in **sail skins**	Unlimited	Unlimited
Thermoplastic **FRP**	450	Unlimited
Commercial pre-consolidated FRP	Unlimited	Unlimited
FRP material not listed above	135	7.0

3.3 Thermoplastic **FRP** material in Rule 3.2:

(a) may be used within any component, including the **hull**;

(b) shall be restricted to a maximum total mass of 15.0 kg, combining all such material within the **yacht** except that which:

(i) is excluded by Rule 3.1; or

(ii) has an elastic modulus not exceeding 8 GPa;

(c) may only be sourced as either:

(i) **constituents** (e.g. pre-preg tape, pre-preg cloth, **fibre**-reinforced additive printing filament); or

(ii) pre-consolidated solid **FRP** in standard shapes (e.g. plate, bar, rod, tube, but not honeycomb), in which case they must be **commercial pre-consolidated FRP** and the temperature limit applies only after delivery of the component from the manufacturer.

3.4 The maximum pressures in Rule 3.2 refer to the average pressure applied over the surface of a component, or to that part of a component under pressure. Local regions of higher pressure may be applied, for example by hand clamps or mechanical fastenings, provided the average is not exceeded.

3.5 The component of pressure applied by conventional wrapping and winding methods (for construction around a mandrel, or similar) is excluded from the pressure limits given in Rule 3.2.

3.6 Electron beam or other non-thermal radiation cure of **FRP** components is prohibited. This does not prohibit curing **FRP** components by passing electrical current through them to generate heat.

3.7 Construction of a **legacy replica hull** and its **hull internals** shall meet the following criteria:

$$k_{LCA} + \sum_{i=1}^{n} a_i (k_{i,PLUG} + k_{i,MOULD}) \geq 2.5$$

where:

a_i is the proportion of the **hull** and its **hull internals** manufactured by a distinct tooling approach;

n is the total number of distinct tooling approaches required to build the **hull** and its **hull internals**;

$$k_{LCA} = \begin{cases} 1, & \text{if a life-cycle analysis is performed on the } \textbf{hull} \text{ and its } \textbf{hull internals} \text{ to the satisfaction of the } \textbf{Measurement Committee} \\ 0, & \text{otherwise} \end{cases}$$

$$k_{PLUG} = \begin{cases} 2, & \text{if a plug is not required} \\ 1, & \text{if at least 80\% of the total mass of the mould plug is constructed of recyclable material (e.g. PET), with that plug being delivered to a recycling plant by 1st January 2024} \\ 1, & \text{if at least 80\% of the total mass of the mould plug is constructed of recycled material} \\ 1, & \text{if at least 80\% of the total mass of the mould plug is constructed of sustainably sourced material (e.g. timber)} \\ 0, & \text{otherwise} \end{cases}$$

$$k_{MOULD} = \begin{cases} 2, & \text{if a mould is not required} \\ 1, & \text{if at least 10\% of the total mass of carbon reinforcement used in the mould is from recycled sources} \\ 1, & \text{if at least 80\% of the } \textbf{fibre} \text{ reinforcement, by mass, used in the mould is constructed from } \textbf{fibres} \text{ with low embodied energy (e.g. basalt)} \\ 1, & \text{if at least 80\% of the total mass of the mould is constructed of sustainably sourced material (e.g. timber)} \\ 1, & \text{if at least 50\% of the } \textbf{fibre} \text{ reinforcement, by mass, used in the mould is natural } \textbf{fibre} \text{ (e.g. flax)} \\ 0, & \text{otherwise} \end{cases}$$

3.8 The life-cycle analysis in Rule 3.7 shall:

(a) be submitted as a written report to the **Measurement Committee**;

(b) follow the guidelines defined by ISO 14040/14044; and

(c) be a cradle-to-gate life-cycle analysis with at least:

(i) the carbon footprint represented in $kgCO_2e$; and

(ii) the production of solid waste represented in kg,

associated with the construction of the **hull** and its **hull internals**, including the sourcing of material, in addition to the transport of the **hull** by sea or air to the Match venue but excluding the use and disposal phases.

3.9 For **legacy hulls** which were **launched** in **AC36** or **AC37**, their sustainability requirements are satisfied by:

(a) the reuse of those **hulls** for **AC38**; and

(b) the limitations on modifications to those **hulls** within these **Class Rules**.

3.10 **Competitors** shall cooperate with **ACP** throughout **AC38** in the progressive strengthening of sustainability requirements, to be binding in the 39th America's Cup. These may include provisions relating to:

(a) **yacht** life-cycle management and end-of-life;

(b) materials and supply-chain responsibility;

(c) operational energy and emissions;

(d) transparency of sustainability reporting; and

(e) wider sustainability initiatives as determined by **ACP**.

4 Commercial products

4.1 **Commercial products** shall fall into the following categories:

(a) **commercial core**;

(b) **commercial pre-consolidated FRP**;

(c) **commercial hardware**; and

(d) **commercial paint**.

4.2 The **Rules Committee** shall maintain a list of approved **commercial products** in each category. Initially, this list will comprise all of the **commercial products** that were approved for use in **AC37**.

4.3 Products to be added to the list of approved **commercial products** must:

(a) be readily available for purchase by all **Competitors** at a reasonable market price;

(b) have a lead time to delivery of no more than twelve months;

(c) not have been developed directly or indirectly for a **Competitor** or specific group of **Competitors**, unless prior to 31 March 2018;

(d) meet the requirements of their nominated **commercial product** category; and

(e) not be globally prohibited by the **AC75 Class Rules**.

4.4 To add **commercial products** to the approved list, **Competitors** must submit a Commercial Product Request to the **Rules Committee** that meets the following criteria:

(a) clearly specify the category for each **commercial product**;

(b) include evidence that the requested products satisfy Rules 4.3 (a) and 4.3 (b). This may be in the form of:

(i) quotes or invoices;

(ii) written affidavits from the supplier; or

(iii) sufficiently descriptive screenshots from the supplier's website;

(c) be submitted at least 6 months prior to the first race of the Match; and

(d) include a maximum of 20 distinct **commercial products**, when combined with all Requests submitted by the same **Competitor** within the same calendar month. Products that differ solely in size or colour are not considered distinct.

4.5 Commercial Product Requests shall be processed as follows:

(a) the **Rules Committee** shall promptly publish the Request, if not automatically distributed;

(b) once a Request has been published, **Competitors** have 10 working days to submit an objection, in the form of a **Rule Enquiry**. Objections may be based on:

(i) insufficient information or evidence supplied in the Request; or

(ii) conflicting evidence presented by the **Competitor**.

(c) Requests may be approved by either:

(i) the absence of any objections complying with Rule 4.5 (b); or

(ii) a **Rules Committee** interpretation finding that all requested products comply with Rule 4.3;

and

(d) if approved, **commercial products** shall be added to the list referred to in Rule 4.2.

4.6 The **Rules Committee** may, at their discretion, extend the period defined in Rule 4.5 (b).

4.7 The **Rules Committee** may maintain a website that:

(a) displays the list of approved **commercial products** detailed in Rule 4.2; and

(b) receives, manages and publishes Commercial Product Requests from **Competitors**.

4.8 Once a product has been added to the list of approved **commercial products**, it shall remain there until the end of **AC38** unless it is determined that false or misleading information was provided during the process for a product's approval. In this situation, if one or more **Competitors** has relied on the product's presence on a list of approved **commercial products**, the case may be referred to the Arbitration Panel for resolution.

4.9 **Commercial pre-consolidated FRP**:

(a) is restricted to a maximum combined mass of 150 kg on each **AC75 Class Yacht**;

(b) shall make up no more than 15.0 kg of a **hull** and its **hull internals**;

(c) shall not be used in a **foil arm fairing**, **foil wing**, **foil flap** or **rudder**; and

(d) shall be sourced as pre-consolidated and cured solid **FRP** material in standard shapes (e.g. plate, bar, rod, tube, but not honeycomb).

4.10 **Commercial hardware**:

(a) is restricted to a maximum combined mass of 150 kg on each **AC75 Class Yacht**;

(b) shall make up no more than 15.0 kg of a **hull** and its **hull internals**;

(c) may contain **FRP** but must not be entirely made of **FRP**; and

(d) shall not be processed to alter its fundamental structure or shape (e.g. machined, re-shaped, melted down or heat-treated), except for:

(i) a single planar cut per **commercial product**;

(ii) local edge finishing such as deburring; and

(iii) pins and fasteners which may have a single hole drilled for a lock wire.

4.11 **Commercial paints** shall only be approved if they are similar in chemical composition and material properties to the paints within the initial list of **Commercial products** referenced in Rule 4.2.

4.12 Approved **commercial pre-consolidated FRP** and **commercial hardware** shall only be counted in the mass limits of Rules 4.9 and 4.10 where those products do not satisfy the other Rule requirements, such as material and construction limits, at the locations in which they are used.

4.13 Rule 4 does not prohibit the use of commercially available products that are not **commercial products**, but the status of a product as a **commercial product** grants it additional permissions, as detailed in other rules such as Rule 2.6.

4.14 It is the **Competitor's** responsibility to ensure that their specific use of each **commercial product** is permitted by the **AC75 Class Rule**.

5 Surface finishes

5.1 Except as permitted in Rules 5.4, 5.5 and 5.6, the outermost layer of the **hull**, **foils** (excluding **foil** systems controlled by Rule 12.3) and **rudder** must be:

(a) **commercial paint**;

(b) unpainted steel; or

(c) plastic film.

5.2 **Competitors** must not alter the chemistry of paints except with products that are a standard part of an approved paint system and used in compliance with the manufacturer's standard guidelines.

5.3 Paints, surface finish additives or plastic films that are designed to reduce surface friction (such as PTFE) shall not be used on the outermost layer of the **hull**, **foils** or **rudder**.

5.4 As an exception to Rule 5.1, occasional regions in the outermost layer of the **hull**, **foils** and **rudder** may be unpainted, provided that:

(a) each region is no more than 0.001 m^2; and

(b) the total area of these regions does not exceed 0.05 m^2 on each **hull**, **foil** or **rudder**.

5.5 Surfaces may be sanded, polished and cleaned, provided that the only substances that remain on those surfaces when the **yacht** is afloat satisfy Rules 5.1, 5.2 and 5.3. Where sanding has unintentionally broken through a permitted surface finish leaving occasional regions of no more than 0.001 m^2 each, these regions are permitted to expose metal, **FRP** or filler as the outermost surface layer of the **hull**, **foils** and **rudder**.

5.6 On areas of the **hull upper**, or on hardware attached to the **hull upper**, **Competitors** are permitted to apply non-skid products or coatings. The accumulated areas shall not be greater than 20 m^2.

5.7 Within a **cockpit**, the outermost **hull** layer may be unpainted **FRP**, if the surface has no significant aerodynamic or hydrodynamic effect beyond that of an equivalent painted surface or unpainted steel surface.

5.8 Devices and finishes that enhance **yacht** performance by altering the structure of the boundary layer are prohibited if they are:

(a) *active*, being devices other than **control surface actuators** that alter the energy of the boundary layer using a source of stored energy or energy from the crew;

(b) *microscopic*, being devices or finishes whose *functional geometry* has a characteristic dimension that is less than 0.05 mm; or

(c) *intra-boundary layer*, being devices or finishes whose entire *functional geometry* is contained within the *boundary band*, referenced to the **yacht** surface in the absence of those devices or finishes;

where *functional geometry* is defined by Rule 5.9, δ is the local boundary layer thickness defined by Rule 5.12, and the *boundary band* is a 2δ-thick band bounded by surfaces offset by $\pm 1\delta$ normal to the reference surface.

5.9 For a device or finish, *functional geometry* means all of its solid surfaces that contribute to its intended fluid-dynamic function by manipulating, displacing, or detaching the *fluid*. This excludes regions whose purpose is to structurally constrain the device, or to expand its geometry beyond the local boundary layer. For example,

(a) the *functional geometry* of a vortex generator:

(i) includes the external surfaces directing *fluid* around that vortex generator, and in particular, the edges used to shed vorticity;

(ii) excludes its method of attachment to the **yacht**;

(iii) excludes extrusions that do not directly contribute to the vortex generator's intended fluid-dynamic function;

(b) the *functional geometry* of a slot:

(i) includes the surfaces forming the passage through which *fluid* flows;

(ii) excludes surfaces forming cavities of stagnant *fluid*;

(iii) excludes any structure beyond the surfaces in Rule 5.9 (b) (i),

where *fluid* is defined as liquid water, water vapour, air, or any combination thereof.

5.10 Examples of devices and finishes that are prohibited by Rule 5.8 are:

(a) electric, magnetic, sonic, thermal, chemical, and pump devices that are *active*;

(b) shark skin, hydrophobic textures and porous media that are *microscopic*; and

(c) Large Eddy Break-Up devices and etched riblets that are *intra-boundary layer*.

5.11 Rule 5.8 (c) does not prohibit devices that have some part of their *functional geometry* lying outside of the *boundary band* described by Rule 5.8 (c), whether extending outward into the **yacht's** surrounding *fluid* or recessed within the surface, such as:

(a) vortex generators, fences and spray rails; and

(b) slots, slats or other passages which transport *fluid* into, out of, or displace the local boundary layer.

5.12 In Rules 5.8 and 5.11, the thickness of the boundary layer δ:

(a) on the **hull upper surface**, shall be assumed to be 80 mm;

(b) elsewhere, shall be determined by the formula:

$$\delta = \frac{0.37x}{Re_x^{0.2}}$$

where

x is the local distance from the forward most point of the object;

Re_x is the local Reynolds number (based on x);

and the following properties and speeds shall be used:

	Velocity (knots)	Density kg/m^3	Dynamic viscosity (Pa.s)
Appendages	30	1025	1.103×10^{-3}
Other **yacht** components	30	1.225	1.789×10^{-5}

5.13 Surfaces of the **yacht** that deviate from smooth only by the microscopic texture inherent to surface finishes permitted by Rule 5.5 are exempt from the prohibitions in Rules 5.8 (b) and 5.8 (c).

5.14 The geometry or function of passive macroscopic devices, such as those detailed in Rule 5.11, may be adjusted by actuation of a **control surface**.

6 *Mass*

6.1 The table below lists masses and **longitudinal** centres of gravity (LCGs) in the **yacht**-fixed frame (*x*, *y*, *z*). The table is for reference only, and Rule 6.1 does not in itself impose any requirements on the **AC75 Class Yacht**. However, other rules do stipulate requirements by making reference to the data tabulated herein.

Component	Mass (kg)	LCG (m)
Yacht assembly	**5875**	**9.200 – 9.350**
Platform	$*m_P$	$*x_P$
Hull, **rudder**, **foil arm fairings** and other parts	—	
Port **foil wing assembly**	*550-580	
†**Foil arm stock**	464	
Starboard **foil wing assembly**	*550-580	
†**Foil arm stock**	464	
†**Foil arm** pins and bearings	64	
Platform-weighed **mast** and **mainsail** hardware	—	
*Platform **one-design** equipment*		
†**FCS**	315	
†**Media equipment**	132.5	
†**Primary battery bank**	125	
†**RigEPS**	10	
†**Guest racer** seat	5	
Class ballast	50	
Mast (excluding parts weighed with **platform**)	$*m_{MAST}$	x_{MAST}
Mast tube and attached components, etc.	—	
*Mast **one-design** equipment*		
†**One-design rigging**	39.5	
†**Media equipment**	28	
Mainsail (excluding parts weighed with **platform**)	$*m_{MAIN}$	**5.70**
Jib	**54**	**12.00**
Crew and **carried equipment**	***435**	
Guest racer and **carried equipment**	***125**	
Total	**6435**	

Measured,* †*One-design*** *equipment*

6.2 Where a specific mass value is detailed within Rule 6, including when that mass value is referenced in another section:

(a) that mass shall be satisfied exactly, to the accuracy measured by the **Measurement Committee**;

(b) on each weigh, ballast shall be adjusted to reach the required values, according to the **Measurement Committee's** scales;

(c) having met the target on the **Measurement Committee's** scales, provided the required ballast is carried whist racing, the relevant mass rule in table 6.1 shall be deemed to be met until:

(i) that component or assembly is modified or reconfigured; or

(ii) the **Measurement Committee** requests a re-weigh;

and

(d) the general tolerance on specified values in the "Units and Reference Frames" section of the **AC Technical Regulations** does not apply.

6.3 Each **foil wing assembly** shall be weighed according to the **Measurement Procedures** and must have a mass as specified for "Port **foil wing assembly**" and "Starboard **foil wing assembly**" in Rule 6.1. Any components that extend from the **foil wing assembly** into **foil arm** may be virtually split, with the relevant part of their mass being removed by calculation.

6.4 The **platform** mass m_P and LCG x_P shall be determined in **platform measurement condition**, and with the following conditions optionally changed if agreed by both **Competitor** and **Measurement Committee**:

(a) the **cant** angle in Rule 7.7 (d) (i); and

(b) the **foil flap** angle in Rule 7.7 (d) (iv).

6.5 The **mast** mass m_{MAST} and centre of mass $(x_{MAST}, y_{MAST}, z_{MAST})$ shall be determined in the **mast** mass measurement condition described by Rule 17.13 where:

(a) centre of mass components in the **mast**-fixed reference frame shall be:

(i) u_{MAST} assumed to equal 0.0 m; and

(ii) v_{MAST} assumed to equal 0.0 m; and

(iii) w_{MAST} as measured;

and

(b) converted into a **yacht**-fixed LCG x_{MAST} by assuming a **mast** rake of 5°.

6.6 The **mainsail** mass m_{MAIN} shall be determined in **mainsail** measurement condition as described by Rule 19.18.

6.7 The **Jib** mass, m_{JIB}, must be within the range specified by the following formula based on the **jib LL** and **jib** girth measurements from Rule 20:

$$m_{JIB} = 31 + 0.34 \times \left(\frac{\mathbf{LL}}{12} \times \left(3.3G_{LP} + 4.25G_{50} + 4.25G_{75} + G_H\right)\right) \pm 1$$

6.8 The value of the **yacht assembly** mass in rule 6.1 is for an assumed **Jib** mass, m_{JIB} of 54 kg. Ballast shall not be adjusted to meet the **yacht assembly** mass in rule 6.1 when racing with a **jib** that has a m_{JIB} that is not 54 kg.

6.9 The **yacht assembly** mass m_Y and longitudinal centre of mass x_Y:

(a) shall be determined by combining the following masses and LCGs:

(i) **platform** mass m_P at LCG x_P;

(ii) **mast** mass m_{MAST} at longitudinal centre of mass x_{MAST};

(iii) **mainsail** mass m_{MAIN} at the LCG specified in Rule 6.1; and

(iv) a **jib** mass of 54 kg, with an LCG as specified in Rule 6.1;

and

(b) must match the mass and lie within the LCG range specified for "**Yacht assembly**" in Rule 6.1.

6.10 The crew and their **carried equipment**:

(a) must have a total mass no greater than specified value for "Crew and **carried equipment**" shown in Rule 6.1; and

(b) may have a mass less than the specified value, in which case, ballast shall be added such that the sum of the crew and **carried equipment** mass meets the specified value. Any such ballast:

(i) shall be attached to the **hull upper** between 7.5 m and 7.7 m forward of **TRP**; and

(ii) shall be split evenly and located in two parts symmetrically about **LCP**; and

(iii) may include additional safety equipment comprising blades or personal air supplies that match the requirements detailed within Rules 11.10 (a), 11.10 (b) and 39.3, but are in excess of the quantity of the items required by those rules.

6.11 The **guest racer** and their **carried equipment**:

(a) must have a total mass no greater than specified value for "**guest racer** and **carried equipment**" shown in Rule 6.1; and

(b) may have a mass less than the specified value, in which case, ballast shall be added such that the sum of the **guest racer** and **carried equipment** mass meets the specified value. Any such ballast shall be attached to the **one-design guest racer** seat.

6.12 Each crew member and **guest racer** may carry or wear a maximum of 5 kg of **carried equipment**, including up to 1 kg of **crew media equipment** and up to 4 kg of other **carried equipment**.

6.13 If components of the *platform* ***one-design*** *equipment* or *mast* ***one-design*** *equipment* vary from the values provided in Rule 6.1 and require amendment, the *class ballast* will be simultaneously adjusted to conserve the sum of *platform* ***one-design*** *equipment*, *mast* ***one-design*** *equipment* and *class ballast* masses.

6.14 The *class ballast*:

(a) shall be positioned 0.75 m forward of the **FCS Transverse Reference Plane**; and

(b) may be split evenly and located in two parts symmetrically about **LCP**.

6.15 Nothing shall be aboard the **yacht** except:

(a) items included in Rule 6.1; and

(b) any retained water permitted by Rule 9.15.

6.16 Where any masses are required to be symmetric about **LCP**, this shall be satisfied to tolerances specified in the **Measurement Procedures**.

7 General arrangement

7.1 The **AC75 Class Yacht** shall comprise exactly:

(a) one **hull**;

(b) two **foils**;

(c) one **rudder**;

(d) one **mast**, which shall include one set of **one-design rigging**;

(e) one **mainsail**; and

(f) one **jib**.

In addition to those required components listed above, the **AC75 Class Yacht** may also include any other parts or components except where prohibited within the **AC75 Class Rules**.

7.2 Except where otherwise specified, components that are described separately within the **AC75 Class Rules** may be physically constructed as single parts, with virtual splits delineating boundaries across which different rules or declarations may apply.

7.3 The only parts of the **yacht** that may lie directly below any location on the **hull lower surface** are:

(a) the **foils**;

(b) the **rudder**; and

(c) **hull** fairing flaps permitted by Rule 8.6.

7.4 The only parts of the **yacht** that may lie more than 1.700 m above **MWP** are:

(a) the **foils**;

(b) the **mast**, sails and **rigging**;

(c) **media equipment**; and

(d) any **competitor** equipment permitted to be added to the **aft media post**.

Deformations of the **yacht** whilst sailing shall be ignored and this condition can be satisfied during shore based measurement. **Competitors** must satisfy the **Measurement Committee** that components cannot be moved while racing resulting in a violation of this Rule.

7.5 In **planform**, the only parts of the **yacht** that may lie outside the area of the **hull surface**:

(a) the **foils**;

(b) the **rudder**;

(c) the **mast**, sails and **rigging**;

(d) **media equipment**; and

(e) any **competitor** equipment permitted to be added to the **aft media post**.

7.6 The **yacht** shall be capable of being lifted:

(a) by a crane, from one or more primary lifting points located forward of **MRP**, with secondary lines led aft; and

(b) by gantry cranes for measurement, from three or four separate lifting points, where:

(i) lifting points must be arranged symmetrically about **LCP**;

(ii) there must be a lifting point at least 1.5 m either side of **LCP**;

(iii) at least one lifting point must be **longitudinally** separated from two others by at least 8.0 m; and

(iv) each lifting point must attract at least 10% of the weight of the **yacht** in **platform measurement condition**.

7.7 The **platform measurement condition** shall be with:

(a) the **yacht** and its components unloaded by **external forces**, except gravity;

(b) no **yacht** components intentionally deformed from their unloaded condition;

(c) the **hull** levelled in a cradle with **MWP** horizontal;

(d) both **foils** having;

(i) the **foil arm** canted such that **WSP** is vertical (as shown in Figure 12.1) ;

(ii) the **foil wing** correctly mounted on the **foil arm**;

(iii) the **foil flap** correctly mounted on the **foil wing**;

(iv) the **foil flap** set to the centre of its range of motion; and

(v) the **foil** systems connected to the **foil wing** and **foil flap**;

(e) the symmetry plane of the **rudder** aligned to **LCP**;

(f) the **rudder** rake set to the centre of its range of motion;

(g) those components of the **mast** and **mainsail** not included in their respective measurement conditions located on the **hull upper** in positions representative of their longitudinal centres of mass with the rig stepped and the **mainsail** hoisted; and

(h) other components in their normal sailing positions,

unless otherwise modified, as detailed in Rule 7.8. Where components are required to be aligned with a reference plane, this shall be satisfied to tolerances specified by the **Measurement Procedures**.

7.8 The **platform measurement condition** may be modified when referenced, for example, by replacing the specified **rudder** rake angle with the full range of **rudder** rake angles. Any conditions not mentioned in a given reference to **platform measurement condition** shall remain as detailed in Rule 7.7.

8 Moving parts and deformation

8.1 Within Rule 8, parts of the **yacht** that *move*, are *moved*, or are *movable* are defined to be those parts that have a degree-of-freedom of movement with respect to the part of the **yacht** to which they are attached, where such movement is applicable:

(a) whether the degree-of-freedom of movement is through a kinematic or compliant connection; and

(b) whether the parts *move* as a result of **external forces**, due to the action of the crew or due to the action of another part of the **yacht**.

8.2 The only parts of the **yacht** that may *move* are:

(a) **foils**,

(b) **foil arm drums**,

(c) **control surfaces**,

(d) parts *moved* to control movement of a **control surface**, including electrical and hydraulic components attached to **control systems**;

(e) parts *moved* in preparation for, or to organise after controlling a **control surface** (e.g. setting a **jib** car prior to tacking, charging a **hydraulic accumulator** or stowing sheets);

(f) seals of penetrations into the **hull**, e.g. a flexible boot, provided such parts *move* only as a result of permitted **control surface** movements and have no purpose other than preventing water ingress;

(g) covers permitted by Rule 8.5, and associated zips or similar linear closing devices whose primary purpose is to close those covers;

(h) slack **rigging** or hoses;

(i) parts of the **FCS**;

(j) access panels being opened or closed (which must not be into the **hull**);

(k) drainage flaps permitted by Rule 8.6;

(l) mechanical devices used only to connect a tow line to the yacht which can be remotely released from a **cockpit**;

(m) mechanical components within electrical systems, such as a **cooling device**, a bilge pump, a line or quadrant connecting a string potentiometer to part of a **control system** or **control surface**;

(n) hand-held devices whose only purpose is to house **passive input devices** and/or **crew indication devices**;

(o) **passive input devices**;

(p) **woollies**;

(q) liquid flowing in an **LCS**;

(r) **media equipment** such as cameras and wind wands;

(s) parts *moved* solely for safety reasons; and

(t) parts *moved* as the result of an unintended breakdown, as determined by the **Measurement Committee**.

8.3 With the exception of parts listed in Rules 8.2 (a), 8.2 (c), 8.2 (d) and 8.2 (g), those parts that *move*, are *moved*, or are *movable* shall have no significant effect on:

(a) aerodynamic loads;

(b) hydrodynamic loads;

(c) the angular momentum of the **yacht**; or

(d) the centre of mass of the **yacht**.

8.4 Components shall not be designed to deform in order to affect the aerodynamic performance of the **yacht**, except for:

(a) covers detailed in Rule 8.5; and

(b) **control surfaces**, as a result of:

(i) **external forces**;

(ii) permitted *movements* of the **AppendageCS**; or

(iii) permitted *movements* of the **RigCS**.

8.5 Covers that fair rebates or penetrations in the **hull upper**, or in hardware attached to the **hull upper**, may *move* or deform, if:

(a) a **rig** or **RigCS** component (the *component*) *moves* within those rebates or through those penetrations;

(b) their *movement* and deformation is caused by the movement of the *component*;

(c) when not deformed, the cover restores the **hull upper** or hardware towards its fair shape in the absence of the rebate or penetration;

(d) the only purpose of the cover is to reduce the aerodynamic drag or maintain attachment of flow in the vicinity of the rebate or penetration; and

(e) their *movement* or deformation has no significant effect on the centre of mass of the yacht.

Covers may include extensions that are required to facilitate or guide their *movement*, but associated systems such as rollers are not permitted to *move*.

8.6 Fairing flaps on the **hull lower**, which are considered open for the purposes of Rule 9.15, are permitted for closing penetrations or conduit exits, provided that they:

(a) are no larger than required to close the drainage area specified by Rule 9.15 (a);

(b) have no purpose other than:

(i) fairing the **hull** when water is not draining; and

(ii) preventing reverse flow; and

(c) are incapable of retaining more than 25 L of water, in total, within the **yacht**. This shall be tested empirically by the **Measurement Committee**, at one or more orientations of the **yacht** not exceeding the range of heel and trim prescribed by Rule 9.15 (d).

8.7 The use of flywheels or gyroscopes to store energy or mechanically provide stabilising forces to the **yacht** is prohibited. Any rotating mass on the **yacht** shall be no larger than required for its permitted purpose.

9 Hull geometry

9.1 Geometric and flotation requirements pertaining to the **hull surface** within Rule 9 must be satisfied exactly with no tolerance.

9.2 The **blueprint** for a **hull** shall be an IGES file that includes:

(a) the **hull surface**;

(b) the **perimeter line**;

(c) the **cockpits**;

(d) the surface entity which encloses the **retained portion**;

(e) the positions of bulkheads required to satisfy Rule 9.8 as separate IGES surfaces;

(f) details of any penetrations permitted by Rule 9.11; and

(g) three measurement reference points, located:

(i) on **MWP** and on **LCP**, at 20.700 m from **TRP**; and

(ii) on **MWP** and on **TRP**, offset 2.000 m either side of **LCP**.

9.3 The **perimeter line** shall:

(a) be a continuous, closed curve entirely coincident with the **hull surface** that divides the **hull surface** into the **hull upper surface** and **hull lower surface**;

(b) be convex parallel to **MWP**, meaning that any line that connects two points on the **perimeter line planform** shall lie on or inside that **planform**; and

(c) lie entirely above **MWP**.

9.4 The **perimeter line** shall:

(a) have its aftmost point lying on **TRP**;

(b) at its greatest distance from **LCP**, lie between 2.400 m and 2.500 m from **LCP**;

(c) at 17.000 m forward of **TRP**, lie no more than 1.600 m from **LCP**;

(d) at 19.000 m forward of **TRP**, lie no more than 1.000 m from **LCP**; and

(e) have its forwardmost point no less than 20.600 m and no greater than 20.700 m from **TRP**.

9.5 The **hull lower surface** shall be **symmetric** about **LCP**.

9.6 At any **transverse** cross-section through the **hull lower surface**:

(a) the lowest point on any cross-section must lie on **LCP**;

(b) no horizontal line shall cut the cross-section more than twice; and

(c) no vertical line shall cut the cross-section more than once below **MWP**.

Parts of a cross-section within cylindrical regions of length 4.000 m and diameter 1.250 m centred on each foil cant reference point, and whose axes are aligned with the foil cant axes, are excluded from this Rule.

9.7 The **hull lower surface** shall:

(a) form a continuous surface bounded only by the **perimeter line**, with no openings except for the exits of watertight conduits permitted by Rule 9.10; and

(b) exclude the walls of watertight conduits permitted by Rule 9.10, which shall be considered **hull upper surface**.

9.8 The **hull surface** shall :

(a) enclose a volume of at least 60 m^3, which must be partitioned by watertight bulkheads located:

(i) more than 9.000 m forward of **TRP**, forward of which the enclosed volume must be at least 35 m^3; and

(ii) between 17.000 m and 19.000 m forward of **TRP**,

and may be optionally partitioned by additional watertight bulkheads;

(b) include watertight drainage conduits permitted by Rule 9.10, with any intersection with a **wet box** closed; and

(c) exclude **hull** penetrations permitted by Rule 9.11 by closing them with surfaces that connect their edges and are fair with respect to the surrounding **hull surface**.

9.9 Two **foil wet boxes** and one **rudder wet box** are permitted, providing:

(a) each **foil wet box** shall enclose a floodable volume of no more than 300 litres;

(b) the **rudder wet box** shall enclose a floodable volume of no more than 30 litres;

(c) each **wet box** shall be self draining according the criteria in Rules 9.15 (a), 9.15 (b) and 9.15 (d);

(d) volumes of non-porous foam or other material within a **wet box** may be subtracted from the **wet box** volume for the purposes of Rules 9.9 (a), 9.9 (b), 9.9 (c); and

(e) any **wet box** that is connected to watertight conduits, as permitted by Rule 9.10, shall require additional drainage area equal to their cross-section, which meets the criteria of Rules 9.15 (b) and 9.15 (d), in addition to the drainage area required by Rule 9.15 (a).

9.10 Watertight conduits are permitted in the **hull**, provided:

(a) their sole purpose is to provide drainage;

(b) they are no larger than required for their permitted purpose; and

(c) their openings are entirely above **MWP**, with;

(i) one opening coincident with the **hull surface**; and

(ii) the other openings coincident with either the **hull surface** or a **wet box**.

9.11 The enclosed volume of the **hull**, including the volumes required by Rule 9.8 must be watertight except for penetrations:

(a) into the **foil wet boxes**, provided that the penetrations lie entirely within regions defined by cylinders of length 1.600 m and diameter 1.250 m centred on each **foil cant reference point** and whose axes are aligned with the **foil cant** axes;

(b) into the **rudder wet box**, provided that the penetration lies entirely within 0.200 m of **LCP** and 1.500 m of **TRP**;

(c) on the **hull upper** and covered by watertight hatches which must not be opened while racing;

(d) for the ejection of water from a bilge pump;

(e) for the passage of systems or **rigging**, which must be at least 0.500 m above **MWP** and at least 0.200 m above the flotation waterplane in the condition specified by Rule 9.20; or

(f) sealed by means of installed hardware. Openings in installed hardware that would allow passage of water into the watertight volume of the **hull** must be at least 0.500 m above **MWP** and at least 0.200 m above the flotation waterplane in the condition specified by Rule 9.20.

9.12 **Hull** penetrations permitted by Rules 9.11 (e) and 9.11 (f) shall:

(a) each have a cross-sectional area at the **hull** external surface that is no larger than 0.05 m^2;

(b) in total, have an aggregate cross-sectional area that is no larger than 0.02 m^2, after subtracting the cross-sectional area of **rigging**, systems and hardware within those penetrations which could significantly obstruct the passage of water; and

(c) have any cross-section of sealing hardware that allows passage of water into the region enclosed by the **hull surface** treated as:

(i) an opening, for the purpose of Rule 9.11 (f); and

(ii) a cross-section that is unable to obstruct water, for the purpose of Rule 9.12 (b).

Penetrations that existed prior to **AC38** are exempt from Rules 9.12 (a) and 9.12 (c), provided the **Competitor** can supply evidence of this to the satisfaction of the **Measurement Committee**.

9.13 A hatch in the **hull upper** shall provide access to the media hold for installation and servicing of **media equipment**. The hatch shall be no smaller than an ellipse measuring 400 by 600 mm and shall be in a position that enables **media equipment** to be installed in its specified location.

9.14 Intentional capture, restraint or retention of water is prohibited.

9.15 Any distinct retained water volume in a **hull** recess, **cockpit**, or other location on the **yacht**, shall be self-draining with the following criteria:

(a) at any water level at or below that calculated by the *melting ice* method described in Rule 9.16, a drainage area of at least 0.050 m^2 for every 1.000 m^3 of retained volume shall be present below that level;

(b) the drainage area in Rule 9.15 (a) shall be:

(i) open to drainage in the absence of a flotation waterplane; and

(ii) free from obstruction, except for fairing flaps permitted by Rule 8.6;

(c) if the **Measurement Committee** determines that compliance with Rule 9.15 (a) does not preclude a **yacht** volume from acting as water ballast, the **Competitor** must demonstrate, by CFD analysis or physical test, that at any water level within that volume at least 90% of the water drains within 30 seconds, thereby satisfying Rule 9.14;

(d) the requirements within Rule 9.15 must be satisfied for the case when **MWP** is horizontal, and for a range of orientations bounded by:

(i) a rotation of the **yacht** by up to $\pm 10°$ about a **longitudinal** axis; followed by

(ii) a rotation of the **yacht** by up to $\pm 2°$ about a (rotated) **transverse** axis;

and

(e) the following regions are exempt from the requirements within Rules 9.14 and 9.15:

(i) porous and textured surfaces provided the **Measurement Committee** is satisfied that these are no larger than necessary;

(ii) a total volume of no more than 5.0 litres comprising incidental features such as hatch gutters and fitting recesses; and

(iii) **foils**.

9.16 For each orientation identified in Rule 9.15 (d), the following *melting ice* analysis method shall be used to demonstrate compliance with Rule 9.15:

(a) all drain exits are closed with surfaces that connect their edges and are fair with respect to the surrounding geometry;

(b) those parts of the **platform** visible from vertically above are extruded vertically up through a distance of 100 mm;

(c) the resulting volume is considered to be a solid block of *ice* resting on the surface of the **platform**, where the bottom surface of the *ice* is coincident with the top surface of the **platform**, and the top surface of the *ice* is 100 mm above that at every point;

(d) the *ice* is assumed to have the same density as the water it becomes when it melts;

(e) sunshine from vertically above the **yacht** melts the *ice* slowly and evenly, with the top layer melting first, and the layer in contact with the **platform** melting last;

(f) as the *ice* melts, the water either runs off the **yacht**, or collects in recesses bounded by either the remaining *ice*, or the **platform**; and

(g) the distinct retained water volumes are the volumes of water left on the **yacht** when the final layer of *ice* has melted.

9.17 The **hull surface** shall satisfy flotation Rules 9.18, 9.19 and 9.20 with:

(a) the **yacht assembly's** mass m_Y assumed to be equal to 6200 kg;

(b) the **yacht assembly's** centre of mass (x_Y, y_Y, z_Y) assumed to be equal to (9.350, 0.000, 0.750);

(c) an assumed water density of 1025 kg/m^3;

(d) buoyancy resulting only from the **hull surface** (not the **foils**, **rudder** or other components); and

(e) hydrostatic pressure acting on all parts of the **hull surface** below the flotation water plane, neglecting flooding of:

(i) volumes that would remain dry assuming that any fairing flaps permitted by Rule 8.6 remain closed; and

(ii) volumes not included in the **hull surface** such as the **foil** and **rudder wet boxes**.

9.18 When constrained to 0° of heel and floated to equilibrium under the conditions of Rule 9.17, the measurement reference points required by Rule 9.2 (g) shall lie no more than 25.0 mm above or below the flotation waterplane.

9.19 When constrained in heel and left free to float to equilibrium in the other degrees of freedom, the centre of mass of the **yacht assembly** and the centre of buoyancy of the **hull surface**, when both are **projected** on to the resulting flotation waterplane, must be separated by at least:

(a) 0.050 m at 7° of heel;

(b) 0.300 m at 15° of heel; and

(c) 1.000 m at 35° of heel.

9.20 When constrained to 90° of heel (such that **MWP** is held perpendicular to a flotation waterplane) and left free to float to equilibrium in the other degrees of freedom, under the conditions of Rule 9.17:

(a) the centre of buoyancy of the **hull surface** shall be at least 0.820 m above **MWP**; and

(b) the angle between **LCP** and the flotation waterplane shall be no more than 5°.

9.21 In the event that a Rule or definition is determined, by means of a **Rule Enquiry**, to prohibit an aspect of a **legacy hull surface** that is not permitted to be modified, that prohibition shall not apply, provided that **legacy hull surface** complied with the version of the **AC75 Class Rules** in force at the time it was declared.

10 Hull structure

10.1 The combination of **hull** and **hull internals** shall collectively be a **linear component**.

10.2 In **platform measurement condition** and when aligned with the reference points of Rule 9.2 (g), the **hull** must match its **blueprint** with tolerances of:

(a) ±5 mm over the **hull lower**; and

(b) ±10 mm over the **hull upper**.

10.3 The **hull** is restricted as follows:

(a) The areal density of any part of the **hull** shall be at least 2 kg/m^2, defined as the mass per unit area obtained by integrating the density of the **hull** along an inward normal ray from a point on the **hull surface**, terminating at the first interior void (excluding voids wholly within the **core**) or, if none, at the next intersection with the **hull surface**;

(b) The areal density of any part of any hatch permitted by Rule 9.11 (c) shall be at least 2 kg/m^2; and

(c) Hardware sealed **hull** penetrations permitted by Rule 9.11 (f) shall not be designed to reduce the combined mass of the **hull** and relevant hardware below that which would be achieved in the absence of the penetration.

This Rule does not imply any stiffness, strength or robustness targets; it exists only to ensure that a **hull** is a solid structure and not, for example, a film-covered space frame structure.

10.4 Within Rule 9.8, a bulkhead is considered watertight if, when subjected to a uniform pressure differential of 10 kPa from either side:

(a) it is structurally capable of withstanding the pressure; and

(b) the combined water flow rate, through all penetrations, does not exceed 100 litres per minute,

as demonstrated by analysis or testing. When demonstrated by analysis, flow rates shall be calculated based on the cross-sectional area of each penetration not occupied by systems, **rigging** or hardware.

10.5 The watertight boundary that separates each **wet box** from the remainder of the enclosed **hull** volume need not satisfy the **hull** structural requirements detailed in Rule 10.3.

10.6 Any **core** used in the **hull** shall have a nominal density greater than or equal to 48 kg/m^3. Up to 10% of the **hull**, by area, shall be exempt from this **core** density limit provided:

(a) the exempt areas are entirely within the **hull upper**; and

(b) the exempt areas still satisfy Rule 10.3.

10.7 The **hull** density requirements in Rules 10.3 and 10.6:

(a) may be demonstrated by evidence provided in construction drawings or equivalent documentation; and

(b) must be averaged over a sample with a cross-sectional area at least equal to that of a circle with a 40 mm diameter.

10.8 Three screws shall be installed on the **hull** for the purpose of locating the reference points of Rule 9.2 (g). If a reference point does not lie on the **hull**, the screw shall be installed at declared offsets from the reference point, as close as reasonably possible to the reference point, and the exact location of the screw shall be included in the **hull blueprint**.

10.9 The **hull** shall be fitted with stanchion sockets for the attachment of lifelines when the **yacht** is ashore. The following requirements apply:

(a) Sockets shall be located on the edge of the working deck along the full length of the **hull** sides and across the transom, at a maximum spacing of 2.200 m.

(b) As an exception, sockets are not required in regions where a **cockpit** wall close to the **perimeter line** forms its own barrier, provided that:

(i) the **hull surface** extends to at least 600 mm above the **cockpit** floor;

(ii) there is no more than 120 mm width of **cockpit** wall, deck or topside surface, measured from the **perimeter line** to the drop to the **cockpit** floor;

(iii) the **cockpit** is at least 500 mm wide at the required depth, that floor width not to be obscured by **hull** or another surface acting as a deck when viewed from above (fittings, pedestals, etc. are permitted to obscure the floor);

(iv) widths herein are measured parallel to **MWP** and perpendicular to the local **perimeter line**; and

(v) the first socket beyond the end of the **cockpit** is a maximum of 300 mm from the last point at which these criteria are met, measured parallel to **MWP** as a girth around the **perimeter line**.

(c) Sockets shall suit 31.8 mm (1¼") stanchions with a minimum depth of 100 mm.

(d) Sockets must be capable of resisting a test load, whereby:

(i) a stiff test stanchion shall be placed in the stanchion socket;

(ii) a load of 350 N shall be applied to the test stanchion at 600 mm above the top of the stanchion socket, in any direction normal to the stanchion;

(iii) the load application point must translate by no more than 100 mm; and

(iv) there must be no damage to the stanchion socket.

(e) Sockets may be covered or plugged when sailing, provided any such cover or plug can be quickly removed.

11 Cockpits

11.1 A **cockpit planform** is a rectangle with:

(a) a length of 800 mm, parallel to **LCP**; and

(b) a width of 600 mm, parallel to **TRP**.

11.2 The **yacht** shall have six **cockpits**, which shall be arranged symmetrically about **LCP**. **Competitors** shall designate one **cockpit** for a **guest racer**.

11.3 Each **cockpit** shall:

(a) be a volume formed by extruding a **cockpit planform** along an axis orthogonal to **MWP**;

(b) extend in height from **MWP** to 2.500 m above **MWP**;

(c) lie entirely aft of a plane 9.000 m forward of **TRP**; and

(d) not overlap or intersect with another **cockpit**.

11.4 Below any intersection with the **platform upper surface**, each **cockpit** shall be bounded, on or inside its volumetric boundary, by:

(a) an adjacent **cockpit**; or

(b) a closed physical boundary (*walls*), that shall prevent a crew member extending any part of their body into any volume below the **platform upper surface** that is contiguous to the **cockpit**.

11.5 As an exception to Rule 11.4, penetrations and limber holes for the:

(a) passage of systems; and

(b) drainage of water

are permitted in **cockpit** *walls*, provided that a sphere of 40 mm diameter cannot pass through them.

11.6 Each **cockpit** shall have a **cockpit aperture**, a **Competitor**-defined line which shall:

(a) lie on the **platform upper surface**;

(b) in **planform**, lie entirely within the **cockpit**; and

(c) form a closed curve demarcating an opening into the **cockpit**.

11.7 In the absence of the crew, each **cockpit** shall accommodate the **cockpit** clearance volume (*CCV*) detailed in Figure 11.1, where:

(a) the *CCV's* top surface shall be:

(i) parallel to **MWP**; and

(ii) aligned with the lowest extent of the **cockpit aperture**;

and

(b) the two straight sides of the *CCV's* top surface shall be within 5 degrees of **longitudinal**.

11.8 With the *CCV* in the position specified by Rule 11.7, no part of the **yacht** except the **rig** and **media equipment** shall be capable of:

(a) intersecting the *CCV*; or

(b) covering any part of the top surface of the *CCV* when viewed from above.

Any material shall be considered capable of covering the *CCV*, regardless of its transparency.

11.9 Structural components used for the connection of the **rig** to the **yacht** are exempt from Rule 11.8 (a) provided:

(a) such components were present on the **Competitor's yacht** in **AC37**;

(b) in **planform**, the **AC38 cockpit aperture** lies entirely within the corresponding **AC37 cockpit aperture**; and

(c) the **cockpit aperture** is placed in the location that minimises the intersection of the structural components and the *CCV*

where evidence of these criteria shall be supplied by the **Competitor** to the satisfaction of the **Measurement Committee**.

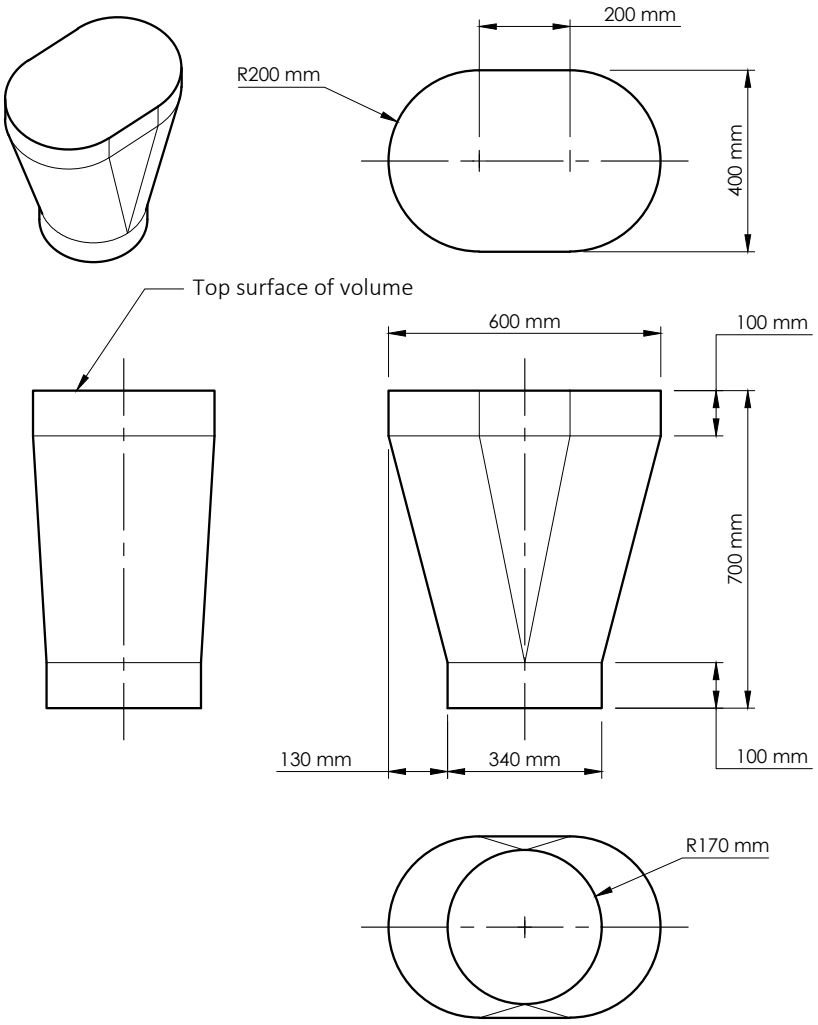

Figure 11.1: **Cockpit** clearance volume

11.10 The following items shall be secured within each **cockpit**, within arm's reach of each crew member's normal sailing position or the **guest racer**:

(a) a knife, with a blade between 50 mm and 150 mm in length; and

(b) a personal air supply that:

(i) contains compressed air equivalent to at least 40 litres uncompressed volume; and

(ii) does not require the use of hands when in use.

11.11 The **guest racer cockpit** shall be fitted with a **one-design** seating module, developed by **ACP**, which:

(a) is exempt from Rule 11.8 (a);

(b) shall include a seat, which **Competitors** shall install in a manner which allows its vertical position to be adjusted within a specified range, depending on the height of the **guest racer**;

(c) shall include a headrest, which shall be fixed at a specified height above the highest point of the **cockpit aperture**, and which shall be designed to have similar aerodynamic drag in the absence of a **guest racer**; and

(d) may have additional mounting and space requirements to be detailed in a specification published by **ACP**.

12 Foils

12.1 Each **foil** shall comprise only:

(a) one **foil arm** and one **foil wing**, which shall be connected to each other according to a detail provided within the **foil arm stock** specification;

(b) one **foil flap**; and

(c) one or more **foil** systems.

12.2 A **foil** excludes:

(a) the removable pins and bearings identified in the **foil arm stock** specification referenced in Rule 43.3;

(b) any **foil arm drum**; and

(c) any other components inside the **hull surface** that are disconnected from a **foil** when it is removed from the **yacht**.

12.3 **Foil** systems:

(a) shall only comprise:

(i) mechanical components;

(ii) electrical components;

(iii) hydraulic components;

(iv) optical fibres; or

(v) sensors, cameras and their housings; and

(b) shall only be designed to:

(i) connect a **foil wing** to a **foil flap** and control its movement;

(ii) connect segments of a **foil flap**; or

(iii) provide sensor information to the **yacht**.

12.4 **Foil** systems shall not:

(a) contribute significantly to the structure or surface area of the **foil wing** or **foil flap**;

(b) produce any hydrodynamic or aerodynamic forces that are significant with respect to the total forces acting on the **yacht**.

12.5 As an exception to Rule 12.4, a housing for a sensor such as a camera which does contribute significantly to surface area or hydrodynamic forces is permitted to be designated as **foil** system, provided:

(a) the hydrodynamic impact of the housing is an unwanted side-effect and is detrimental to performance;

(b) the only purpose of the housing is to house a sensor, and not to generate or modify the hydrodynamic behaviour of the **foil**; and

(c) the designation is only applicable when not racing.

12.6 **Foil** systems that are:

(a) above the upper extent of the **foil wing box** when **WSP** is vertical shall be contained entirely within the **foil arm**; and

(b) below the upper extent of the **foil wing box** when **WSP** is vertical:

(i) shall, when **projected** to **TRP**, be contained entirely within the **foil wing box**; and

(ii) shall have a total combined volume lying outside both the **foil wing hydrodynamic surface** and the **foil flap hydrodynamic surface** that does not exceed 3% of the combined volume enclosed by the **foil wing hydrodynamic surface** and the **foil flap hydrodynamic surface**.

12.7 In **platform measurement condition**:

(a) the **foil arm** must be incapable of any movement relative to the **hull** except:

(i) **cant**, a rotation about the **foil arm** cant axis defined in Figure 12.2; and

(ii) normal play within the **one-design cant** bearings;

(b) the **foil arm** cant axis shall be **longitudinal** within a build tolerance of $\pm$0.1 degrees;

(c) the **foil** shall be capable of reaching **cant** angles of 10.0° and 119.5°; and

(d) and at all **foil flap** rotation angles and twists:

(i) the **foil wing** and **foil flap**, **projected** to **TRP**, must lie entirely within the **foil wing box**; and

(ii) the entire **foil** must lie between planes 10.000 m and 12.000 m forward of **TRP** at the cant angles of 41.4° and 119.5°,

with **cant** angles permitted a tolerance of $\pm$0.5 degrees.

12.8 For each **foil**, the Wing Symmetry Plane, **WSP**, is identified in Figure 12.1 and is fixed to the **foil wing**, rotating as the **foil arm cants**.

12.9 The only device permitted to modify the shape of a **foil** is a single **control surface actuator** within a **foil** system, which shall drive the **FlapDOF** about the axis described in Rule 15.11. Any deformation in the **foil** resulting from this actuation is restricted by Rule 15.14.

12.10 No part of a **foil** except the ODA Lower Belt Assembly and the ODA Head Assembly identified in the **foil arm stock** specification may touch any part of the **yacht** except:

(a) a **foil arm drum**;

(b) hydraulic connections for **foil** systems; and

(c) electrical and optical fibre connections.

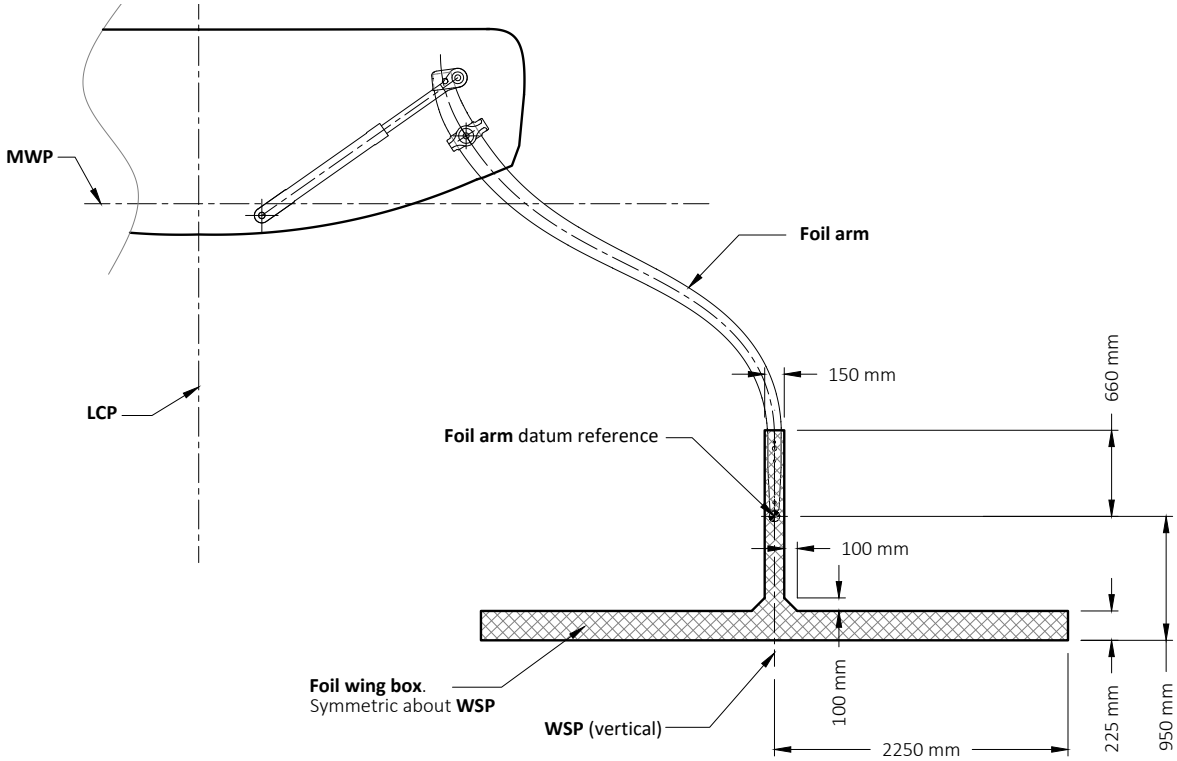

Figure 12.1: The extents of the **foil wing box** are defined by the shaded region in this figure.

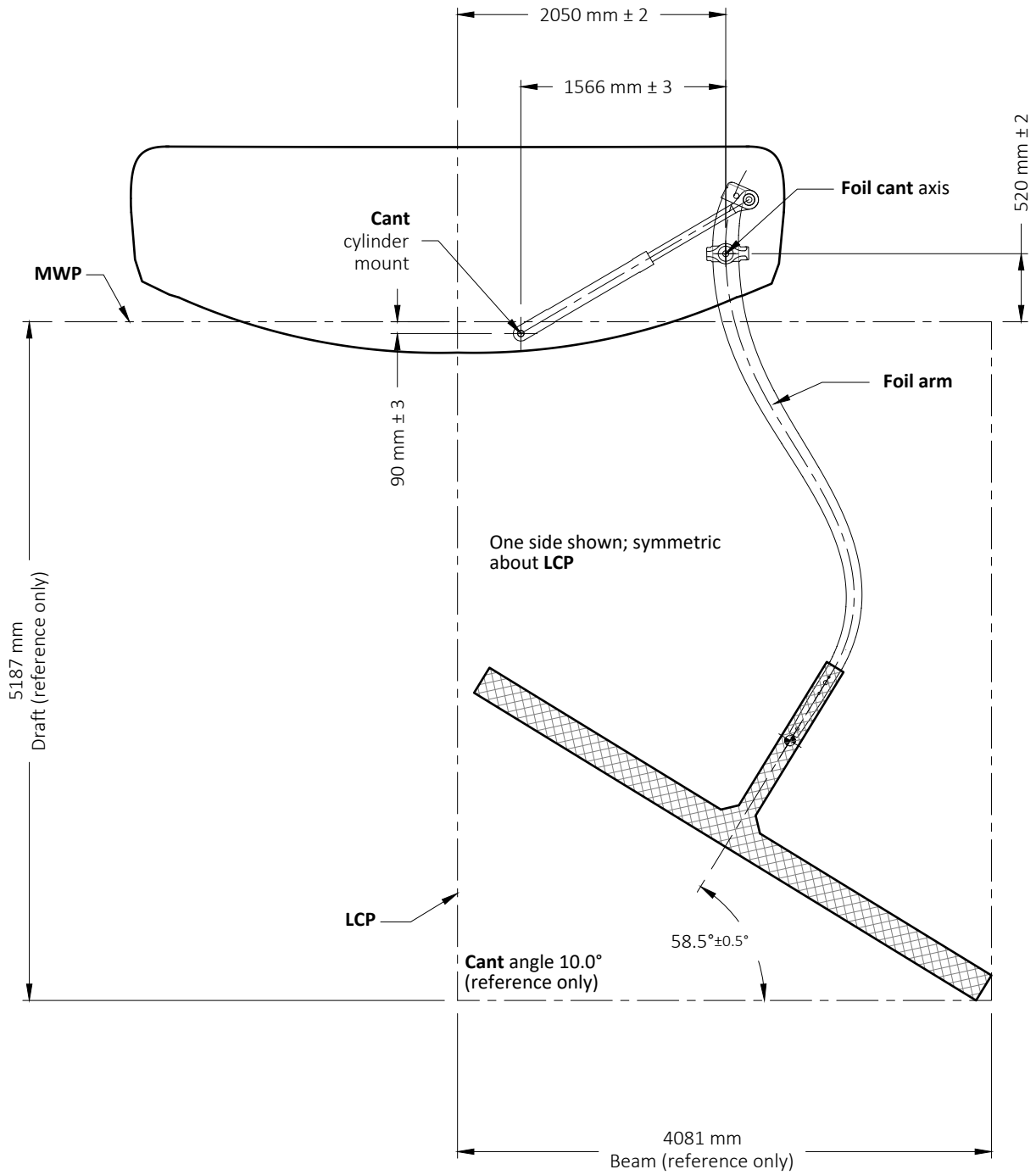

Figure 12.2: **FCS** geometry

13 Foil arms

13.1 Each **foil arm** shall be a **linear component** comprising exactly:

(a) one **foil arm stock**;

(b) one **foil arm fairing**; and

(c) additional material as permitted by the **foil arm stock** specification.

13.2 The **foil arm stock** specification is defined by the document referenced in Rule 43.3.

13.3 The **foil arm stock** must match the **foil arm stock** specification. No modifications are permitted except for:

(a) the surface finish (sanding and painting as permitted in the **foil arm stock** specification);

(b) the installation and repair of optical fibres and fairing over, provided any additional grooves cut for placement of the optical fibres are in the surface of the **foil arm stock** and no wider or deeper than the grooves already provided;

(c) the attachment of permitted **foil arm fairings**, which shall only involve the addition of material bonded to the **foil arm stocks**; no part of the **foil arm stock** may be removed, except for surface preparation prior to bonding and sanding to fair the surface after bonding;

(d) repairs that return the **foil arm stock** to its original state after being damaged in accordance with the **AC Technical Regulations**; and

(e) the addition of material to the **foil arm** leading edge conduit to seal or avoid water retention.

13.4 Except as permitted in Rule 13.3, nothing may be added within a **foil arm stock**, except that **foil** systems may pass through the conduit in the **foil arm** leading edge.

13.5 **Foil arm fairings** are only permitted in the regions indicated in the **foil arm** drawing "ODA Surface Finish Allowance and **Foil Arm Fairing** limitations" of the **foil arm stock** specification.

13.6 **Foil arm fairings** shall not be capable of transmitting any significant bending, shear or torsional loads between the **foil wing** and the **foil arm**.

13.7 **Foil arm fairings** shall not contribute to the global stiffness of the **foil arm**, measured between its two ends, by more than:

(a) 2.5% when measured as a bending stiffness parallel to the cant axis; or

(b) 2.5% when measured as a torsional stiffness about an axis joining:

(i) the **foil cant reference point**; and

(ii) the "Foil arm datum reference" as identified in Figure 12.1, **projected** on to the **FCS transverse reference plane**.

13.8 Penetrations into the **foil wet boxes**, as permitted by Rule 9.11 (a), may be closed by a **foil arm drum**, which:

(a) must fit entirely within the cylinder described in Rule 9.11 (a);

(b) must be a **linear component** and, in the absence of **external forces**, must remain undeformed at all **foil cant** angles;

(c) must not translate, and may only rotate about the relevant **foil cant** axis;

(d) may only rotate as a result of **foil cant** rotation; and

(e) may either:

(i) be attached to the **foil arm**, provided it can be disconnected to allow removal of the **foil arm** from the **yacht**; or

(ii) not be attached to the **foil arm** but rotate as a result of contact with the **foil arm**.

13.9 Each **foil arm** shall enclose a floodable volume of no more than 25 litres;

14 Foil wings

14.1 A **foil wing** shall be a **linear component**.

14.2 The **blueprint** for a **foil wing** shall be an IGES file that includes:

(a) the **foil wing's hydrodynamic surface**;

(b) a point that corresponds to the **foil arm** datum reference;

(c) a line or lines indicating the **foil flap** hinge axes; and

(d) the surface entities that enclose:

(i) the **retained portion**;

(ii) any regions of the **foil wing** classified as **high strength metals**; and

(iii) any regions of the **foil wing** classified as **foil flexure**.

These geometries shall represent the geometry that the **foil wing** was designed to.

14.3 A **foil wing** shall match its **blueprint** within tolerances specified in the **Measurement Procedures** with the **foil wing** in an unloaded, undeformed condition, except that if the **foil wing** is measured when hanging or supported by the **foil arm**, an allowance shall be made for deformation due to self-weight.

14.4 A **foil wing** must be **symmetric** about **WSP** in **platform measurement condition**, with a build tolerance of 3.0 mm on position and 1.0 mm on the shape of any cross-section.

15 Foil flaps and flexures

15.1 A **foil flap** shall comprise one or more *flap segments*, each of which shall be a **linear component**.

15.2 The **blueprint** for a **foil flap** shall be an IGES file that includes:

(a) each *flap segment's* **hydrodynamic surface**, positioned relative to each other as they are assembled into the **foil**, which together form the **foil flap's hydrodynamic surface**;

(b) a line or lines indicating the **foil flap** hinge axes; and

(c) the surface entities that enclose:

(i) the **retained portion**;

(ii) any regions of **foil flap** classified as **high strength metals**;

(iii) any regions of **foil flap** segments classified as **foil flexure**; and

(iv) any regions of **foil flap** segments classified as *segment end regions*.

These geometries shall represent the geometry that the **foil flap** was designed to.

15.3 A **foil flap** shall match its **blueprint** within tolerances specified in the **Measurement Procedures**. Measurement shall be carried out with the **foil flap** in an unloaded, undeformed condition, except that if the **foil flap** is measured when hanging or supported by the **foil wing**, an allowance shall be made for deformation due to self-weight.

15.4 *Segment end regions* referred to in Rules 15.2, 15.5 and 15.10 (a) (i) are permitted within cross-sections parallel to **WSP** through a maximum combined total span of 450 mm, where span is measured perpendicular to **WSP**.

15.5 Except within *segment end regions*, at any cross-section parallel to **WSP** there shall be no more than one *flap segment*.

15.6 The following shall be **symmetric** about **WSP** in **platform measurement condition**:

(a) the number and arrangement of **foil flap** segments, where a *flap segment* may cross **WSP** provided it is **symmetric** about **WSP** in **platform measurement condition**;

(b) the **foil flap**, with a build tolerance of 3.0 mm;

(c) the **foil flap** hinge axes, with a build tolerance of 3.0 mm; and

(d) the ranges of rotations and twists that can be achieved, with a build tolerance of ± 0.5 degrees.

15.7 A **foil flexure** must be classified as a region of:

(a) a **foil wing**;

(b) a **foil flap**; or

(c) material that is partly **foil wing** and partly **foil flap**, with a virtual split line delineating the boundary.

15.8 Within Rules 15.9 and 15.10 (b) (i):

(a) the stated requirements apply at all cross-sections parallel to **WSP** and all **foil flap** rotation angles;

(b) the *chord length* at a given cross-section and a given **foil flap** rotation angle is the linear distance, measured perpendicular to **TRP**, between the foremost point and the aft most point in the cross-section;

(c) the *chord length* of a **foil flexure** means the total *chord length* measured from the foremost point of any **foil flexure** to the aft most point of any **foil flexure** in that cross-section;

(d) the following shall be neglected when determining *chord length*:

(i) the **foil arm** and any **foil** system;

(ii) any part of the **foil wing** that is aft of the aft most point of the **foil flap** in any cross-section; and

(iii) hinges or other parts of a **foil flap** or **foil wing** which occur at occasional cross-sections for connection between the **foil wing** and **foil flap**.

15.9 The *chord length* of a **foil flap** shall be no more than 50% of the *chord length* of the **foil**.

15.10 At any cross-section parallel to **WSP**:

(a) within *segment end regions*:

(i) the *chord length* of a **foil flexure** shall be no more than 50% of the *chord length* of the **foil**;

(b) elsewhere:

(i) the *chord length* of a **foil flexure** shall be no more than 20% of the *chord length* of the **foil**; and

(ii) a **foil flexure** shall not extend to the aft most point of the cross-section.

15.11 At any cross-section parallel to **WSP**, the only permitted movement of a **foil flap** relative to a **foil wing** is the **FlapDOF**, a rotation about a hinge axis that:

(a) must be designed to be stationary with respect to the **foil wing** at that section, such that the resulting position of any point on the **foil flap** differs by no more than ± 2.0 mm from the corresponding position on a perfectly rigid **foil flap** rotated about a fixed hinge axis; and

(b) need not lie inside the cross-section of the **foil wing** or **foil flap**, but must be at a finite distance from the **foil**.

For the avoidance of doubt, deformation is not considered to be a type of movement within this rule, and is instead restricted by Rule 15.14.

15.12 Every tangent to a hinge axis shall subtend an angle of at least 45° to **WSP**.

15.13 At any cross-section parallel to **WSP**, a **foil flap** shall not rotate about the hinge axis by more than ± 45 ° from a central position.

15.14 The cross-sectional shapes of the **foil wing** and **foil flap**, when translated and rotated to account for any global deformation of the component, shall lie within ± 2.0 mm of their **blueprint's** local cross-sectional shapes, except over the surface of any **foil flexure**, to be satisfied:

(a) at any cross-section through a **foil** perpendicular to the local **foil flap** hinge axis;

(b) for all **foil flap** rotation angles and twists; and

(c) in the absence of **external forces** except gravity.

15.15 In the absence of **external forces**, a **foil flexure** shall only deform as the result of differential rotation between those parts of:

(a) a **foil wing** and a **foil flap**; or

(b) different **foil flap** segments,

that are not classified as **foil flexure**. A **foil flexure** may touch or come into contact with a **foil** system, provided that contact does not significantly affect the external surface shape of the **foil flexure**.

16 Rudder

16.1 A **rudder** shall be a single **linear component**.

16.2 For the purpose of the component limits in the **AC Technical Regulations**:

(a) any material attached to the **rudder** capable of lying directly below any location on the **hull lower surface** must be declared as part of the **rudder**;

(b) any part that does not make up the **linear component** of the **rudder** shall not be part of the **rudder**; and

(c) any removable part of the **rudder linear component** that is always entirely above the **hull lower surface** can optionally be declared as part of the **rudder**, but if it is declared as part of the **rudder** in the **Version A** declaration, it will always be controlled by the component limits in the **AC Technical Regulations**.

16.3 The **blueprint** of a **rudder** shall be an IGES file that includes:

(a) the **rudder's hydrodynamic surface**;

(b) a point entity indicating the position of the lower **bearing centre**; and

(c) a surface entity which encloses the **retained portion**.

These geometries shall represent the geometry that the **rudder** was designed to. A change in the position of the lower **bearing centre** does not in itself constitute a change according to the component limits in the **AC Technical Regulations**, but since it is defined in the **blueprint**, it does invalidate a Measurement Certificate.

16.4 In **platform measurement condition**:

(a) a **rudder** shall match its **blueprint** within tolerances specified in the **Measurement Procedures**;

(b) the **wetted** part of the **rudder** must be **symmetric** about the **rudder** centre plane, with a build tolerance of 3.0 mm; and

(c) the **rudder** must only be capable of the following movements, relative to the AC75 **yacht**:

(i) the **SteeringDOF**, being a yaw rotation about an axis joining the lower and upper **bearing centres**; and

(ii) the **RakeDOF**, being a rotation about a **transverse** axis through the lower **bearing centre**.

16.5 In **platform measurement condition**, and with the **rudder** centre plane aligned with **LCP**:

(a) there must be an achievable rake angle at which the **planform** of the lowest 0.500 m of the **rudder** has an area of at least 0.300 m^2; and

(b) at all rake angles that can be achieved, no **wetted** part of the **rudder** shall extend:

(i) aft of **TRP**; or

(ii) forward of a **transverse** plane 1.500 m forward of **TRP**.

16.6 In **platform measurement condition** and at all yaw and rake angles that can be achieved:

(a) no **wetted** part of the **rudder** shall extend further outboard than planes offset from **LCP** by 1.500 m both to port and to starboard; and

(b) the **rudder** must not touch any part of the **yacht** except:

(i) the bearings corresponding to the **bearing centres** detailed in Rule 16.7;

(ii) optical fibre and electrical connections for instrumentation within an **ILS**;

(iii) a device whose only purpose is to react yaw moment and control yaw angle, connected to the **SteeringCS**; and

(iv) the **hull lower** within 0.500 m of any yaw axis as defined in Rule 16.4 (c) (i).

16.7 The **bearing centres** referenced in Rules 16.3 and 16.4 (c) shall meet the following requirements:

(a) the lower **bearing centre** must be a fixed point that lies within 3 mm of **LCP**; and

(b) the upper **bearing centre**:

(i) can move, but must always lie within 3 mm of **LCP**; and

(ii) must always be vertically separated from the lower **bearing centre** by at least 600 mm.

16.8 No device shall be used to induce deformation in the **rudder**; any deformation may only be the result of **external forces** and reactions by components permitted in Rule 16.6 (b).

17 Mast

17.1 A **mast** specification will be issued according to Rule 43.3 which will include details of:

(a) the **mast surface specification**;

(b) the minimum required **mast tube** laminate and construction details;

(c) the **one-design rigging**;

(d) **mast fittings**, some of which may be specified as **one-design** components;

(e) the rig plan, including required chainplate and **MRP** positions on the **hull**;

(f) the **mainsail** buoyancy system; and

(g) **legacy mast tube** modification procedures.

Specification within Rule 17 refers to the parts of this **mast** specification.

17.2 Except where otherwise indicated within the **AC75 Class Rules**, or due to deformations caused by sailing loads, all components of the **mast** listed in Rule 17.1 must match the *specification*.

17.3 The **blueprint** of a **mast tube** shall be a zip file of two-dimensional drawings in PDF format that include:

(a) complete laminate drawings of the **mast tube**;

(b) details of any changes from a previous version of the **mast tube**; and

(c) shapes which enclose the **retained portion**.

17.4 With the **mast tube** supported as described in Rule 17.5:

(a) the external surface of the **mast tube** shall match the **mast surface specification** to within $\pm$3 mm for any cross-section orthogonal to the aft face of the **mast surface specification**; and

(b) the aft face of the **mast tube** shall be straight within $\pm$10 mm along the length of the **mast tube**.

17.5 The **mast tube** geometry requirements in Rule 17.4 shall be measured with the **mast** supported horizontally in two cradles, with the aft face upwards. The supporting cradles shall be:

(a) centred at 20.0 m $\pm$ 0.5 m and 3.5 m $\pm$ 0.5 m above **MRP**;

(b) have a maximum bearing width of 0.3 m; and

(c) shall be unclamped with the **mast** free to pivot in the cradles about the **mast** *v* axis.

17.6 The following exceptions to Rule 17.4 are permitted:

(a) rebates for the attachment of components, provided such rebates are filled to match the **mast surface specification** within the tolerance required by Rule 17.4 (a);

(b) additional holes with a maximum diameter of 21 mm in the **mast tube**, including through bulkheads, for fasteners used to attach **mast fittings**. Such holes must not reduce the stiffness or strength of the **mast tube** and **Competitors** may be required by the **Measurement Committee** to provide documentation supporting this; and

(c) openings and covers over openings in **legacy mast tubes** for **legacy one-design mast fittings** that are no longer in the **mast surface specification**.

17.7 Openings in the aft face of the **mast tube**, in addition to those in the **mast surface specification**, are permitted to provide access to permitted systems, and to allow passage of the **RigCS** and instrumentation cables. Such additional openings shall be no larger than required, and shall have:

(a) a maximum dimension of 150 mm;

(b) a maximum area of 0.018 m^2;

(c) a minimum distance of 250 mm between the boundaries of any two openings; and

(d) a maximum combined area of 0.1 m^2.

Any fastener holes in the aft face used for the attachment of **mast fittings** permitted by Rule 17.6 (b) do not count as openings in this Rule. Openings in the aft face of the **mast tube** may be sealed with covers.

17.8 The *specification* prescribes the minimum required laminate for the **mast tube**, which may be reinforced by:

(a) using laminates comprising greater **fibre** weight, resin content, number of layers, **core** density, and/or **core** thickness than provided in the *specification*;

(b) adding laminate external to the **mast surface specification**, provided it remains within the tolerances given in Rule 17.4.

The outer layer of the **mast tube** laminate required by the *specification* shall not be sanded other than for local repairs and reinforcements performed after the **mast tube** has been cured, but may be painted or covered in branding material such as plastic film.

17.9 Laminates are not required to meet the *specification* within 300 mm of the intersection between the aft face of the **mast tube** and the **mast upper plane**.

17.10 The **one-design rigging** shall not be modified except for:

(a) the addition of up to two fairing or vibration mitigation devices per lower shroud and cap shroud, which shall each fit within a cylinder of 100 mm diameter and 600 mm length;

(b) maintenance permitted in the manual provided by the **one-design rigging** manufacturer; and

(c) other repairs approved by the **one-design rigging** manufacturer.

17.11 No components of the **mast**, other than **rigging** and components of the *specification* are permitted to extend more than:

(a) 7800 mm aft of the aft face of the **mast tube** or 20 mm forward of the leading edge of the **mast tube**, within the **mast lower zone**;

(b) 30 mm aft of the aft face of the **mast tube**, between the **mast lower zone** and a plane 300 mm below the **mast upper plane**;

(c) 3 mm outside of the **mast tube**, forward of the aft face of the **mast tube** between the **mast lower zone** and a plane 300 mm below the **mast upper plane**;

(d) 200 mm aft of the aft face of the **mast tube** within 300 mm of the **mast upper plane**; or

(e) 30 mm outside of the **mast tube**, forward of the aft face of the **mast tube**, within 300 mm of the **mast upper plane**.

These restrictions will be measured at the local height in the **mast**-fixed reference frame. If components of the **mast** extend below the **mast tube** then for the purpose of this measurement the **mast tube** will be extended to the local height of the measurement.

17.12 No part of the **mast** shall extend beyond the **mast upper plane** except for **media equipment**.

17.13 The **mast** in **mast** mass measurement condition shall:

(a) be suspended from two points at least 20.0 m apart;

(b) have the **one-design rigging** positioned loosely, with lower end terminals within 100 mm of **MRP**;

(c) include all halyards positioned as they would be with all sails hoisted; and

(d) include all components that are attached to the **mast** when it is arranged in **dock tune** and remain on the **yacht** while racing. Other components of the **mast** shall be included in the **platform measurement condition**.

17.14 When racing, the **mast** shall be positioned and tensioned on the **hull** in a **dock tune** prescribed by the *specification*. Neither the **mast**, nor the positions of **MRP** and the **hull** chainplates shall be adjusted relative to the **hull** except for:

(a) rotation of the **mast** about **MRP** by the action of a device, or devices, attached to the **mast** within the **mast lower zone**;

(b) movement of the **RigCS** within the **mast lower zone** for the purpose of controlling the **mainsail**;

(c) incidental movement of fairings or **mast** components in the **mast lower zone** due to contact with the crew, **hull**, deck gear, **rigging** or other items attached to the **hull**; and

(d) movement of the **mast** due to adjustment by the **RigCS**.

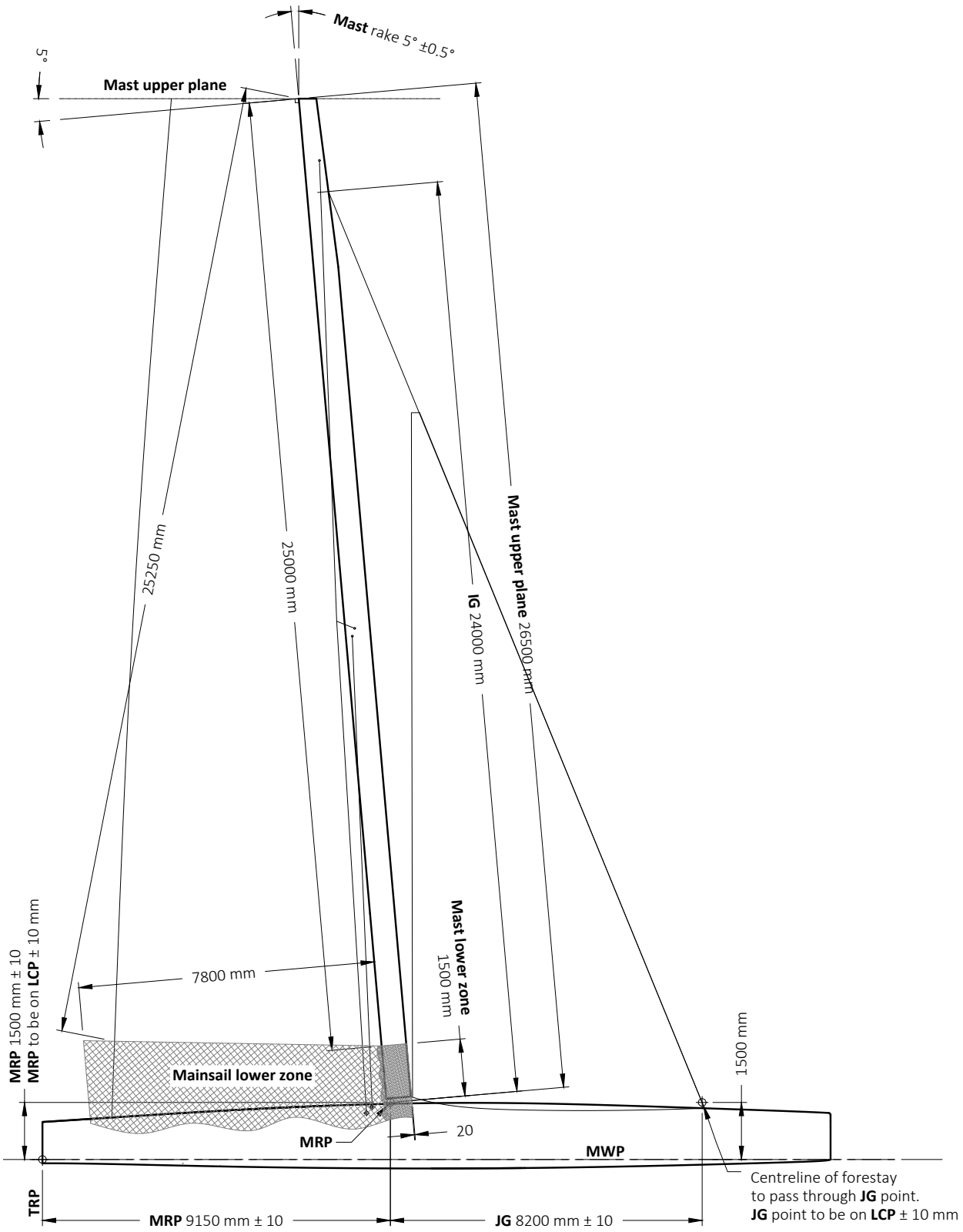

Figure 17.1: Sail Plan

18 Sails

18.1 The **blueprint** of a **sail skin** shall be a two-dimensional drawing in PDF format that includes:

(a) dimensions for all girth measurements that are restricted by the **AC75 Class Rule**;

(b) details of any area changes with respect to the previous version of the **sail skin**;

(c) the **retained portion**, expressed on the drawing as annotated lines/hatching/shading, etc. and as a numerical value in square metres; and

(d) the total area of sail skin bounded by the **luff**, **head**, **leech** and **foot**.

18.2 Shore-based sail measurements are to be carried out with either **battens** removed, or **battens** installed under minimal compressive load.

18.3 The 25%, 50% and 75% **sail skin** girths are taken from the 25%, 50% and 75% **leech points** to the nearest point on the **luff** as illustrated in Figures 19.2 and 20.1. If hollows exist in the **leech** between **battens** adjacent to a girth measurement point then the girth shall be taken beyond the **leech** to a straight line that bridges the **leech** between these **battens**.

18.4 Openings through **sail skins** are prohibited. This rule does not prohibit access panels that are fully covered and closed while racing. Penetrations may exist that are either small such as those created by stitching, or filled such as penetrations used for attaching **sail hardware**. Control lines shall not pass from one side of a **sail skin** to the other.

18.5 Stiff **sail skin** reinforcements are permitted within 1.0 m of **head points**, **peak points**, **clew points**, **tack points** and anywhere within the **mainsail lower zone**. Elsewhere, **sail skins** shall be capable of being folded without clearly visible structural failure.

18.6 **Battens**:

(a) shall pass through a 75 mm diameter circle;

(b) shall be single-piece components without hinges or other mechanisms;

(c) shall, when unloaded and without **external forces**, have a straight central axis to a tolerance of 5 mm over any 1000 mm length and 25 mm over their entire length;

(d) shall not be inflatable; and

(e) shall be located inside a sail pocket not exceeding 260 mm in internal width measured normal to the lengthwise axis of the **batten**.

Battens of the **mainsail** that are located entirely within the **mainsail lower zone** are unrestricted by this Rule.

19 Mainsail

19.1 A **mainsail** must comprise exactly two **sail skins**. Other components that may make up a **mainsail** are limited to:

(a) **battens**;

(b) connections between **sail skins** and **battens** as permitted in Rule 19.15;

(c) **sail hardware**;

(d) **leech**, **head** and **foot** lines no greater than 6 mm in diameter, and no more than one line at any point along a **sail skin** edge;

(e) a **trip line**;

(f) components of the **RigCS**;

(g) fairings as permitted in Rule 19.12;

(h) the **mainsail** buoyancy system prescribed by Rule 19.17; and

(i) **woollies**.

19.2 When determining a **mainsail** measurement length or girth:

(a) the greatest value from both **sail skins** shall be taken; and

(b) the offset between the local **luff** of a **sail skin** and the aft face of the **mast tube** shall be added to each girth measurement.

19.3 **Mainsail** girths, when measured ashore, shall be limited as follows:

		Minimum	Maximum
G_F	**Foot girth** (m)	7.000	7.400
G_{25}	25% girth (m)	6.000	6.500
G_{50}	50% girth (m)	5.000	5.600
G_{75}	75% girth (m)	3.600	4.400
G_H	**Head girth** (m)	2.000	3.000

19.4 **Mainsails** shall comply with:

$$130.0 < \frac{26.5}{12} \times (G_F + 4G_{25} + 2G_{50} + 4G_{75} + G_H) < 140.0$$

For the avoidance of doubt, this formula is a girth restriction only and shall not be used as a measurement of sail area.

19.5 When ashore, the angle α_H, between the straight line from the **head point** to the **peak point** and the **head point** to the **clew point**, illustrated in Figure 19.2, is limited by:

$$\alpha_H \leq 93.5^\circ - 2\arcsin\left[\frac{G_F}{53.5}\right]^\circ$$

19.6 The **luff** of any **skin** of a **mainsail** shall not be forward of the aft face of the **mast tube** at any point.

19.7 The **head points** of both **skins** of a **mainsail** shall be below the **mast upper plane** when connected to the **mast** as it will be during racing, and subject to a sail load that:

(a) is at an angle of 15° relative to the aft face of the **mast tube**;

(b) is reacted by the **mast** through all attachment and bearing points within 1000 mm of the uppermost point of contact; and

(c) is at least 1000 kgs.

Competitors may demonstrate this requirement by analysis, in which case the **Measurement Committee** may request drawings that illustrate how the **mainsail** interfaces with the **mast** and verify that the as-built parts match the supplied drawings.

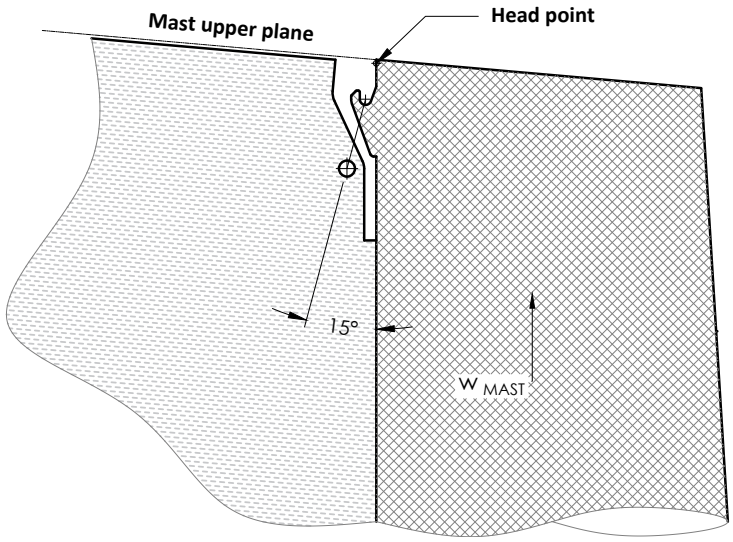

Figure 19.1: **Mainsail** load angle for **head point** measurement.

19.8 When measured ashore, no part of a **mainsail skin** may extend more than 15 mm above a straight line from the **peak point** to the **head point**.

19.9 No part of the **mainsail** is permitted to extend more than 7800 mm aft of the aft face of the **mast tube**, or planar extension thereof. This measurement shall be carried out in the **mast**-fixed reference frame.

19.10 Each **skin** of the **mainsail** shall have at least one continuous attachment to the **mast tube** from 1.5 m above **MRP** to 0.5 m below the **head point**. This attachment shall not have any gaps or overlaps that would allow a line to pass through.

19.11 With the exception of hardware within the **mainsail lower zone**, the largest dimension of any **sail hardware** for a **mainsail** shall not exceed 650 mm.

19.12 **Mainsail** fairings are permitted only for the purposes of:

(a) fairing **RigCS** components, where they shall lie entirely within the **mainsail lower zone**, may be flexible, and may be attached to the **sail skins**; and

(b) sealing the area between the **sail skins** and the **mast**, where any attachment to the **sail skins** or the **mast** shall be within 300 mm of the **mast upper plane**.

Mainsail fairings permitted by this shall not be considered to be part of a **sail skin**.

19.13 The **mast** and **mainsail** shall not have features such as flaps, excess **sail skin** material, or **RigCS** fairings designed to cover or fair the **cockpits** or crew in their normal sailing positions except occasionally when the **mainsail** is well-eased.

19.14 Each **sail skin** of a **mainsail** may have:

(a) up to 10 **battens** that run from within 100 mm of the **luff** to within 100 mm of the **leech** and are above the **mainsail lower zone**;

(b) up to 6 **battens** shorter than 1.0 m that have one end terminating within 50 mm of the **leech** and are above the **mainsail lower zone**; and

(c) any number of **battens** that lie entirely within the **mainsail lower zone**.

19.15 With the exception of fairings permitted by Rule 19.12 (b), connections between **skins** of a **mainsail** or between **battens** of a **mainsail** above the **mainsail lower zone** shall:

(a) lie entirely within 400 mm of the **luff** or the **leech** of a **sail skin**;

(b) span no more than 150 mm vertically with the **mainsail** in an unloaded state; and

(c) be no closer to each other than 2.0 m for any connection within 400 mm of the **leech**.

Within the **mainsail lower zone** there are no restrictions on connections between **sail skins** or **battens**.

19.16 Except for the **mast tube**, whose adjustments are controlled by Rule 17.14, no **RigCS** components shall be attached to or bear upon the **mainsail** above the **mainsail lower zone**.

19.17 A **one-design mainsail** buoyancy system, as defined in the **mast** specification in Rule 17.1, shall be attached to the starboard **sail skin** of the **mainsail** so that the position markers of the **mainsail** buoyancy system remain within 100 mm of the **head** of the starboard **sail skin**. **Competitors** shall adhere to any inflation regulations provided in the **mast** specification.

19.18 The **mainsail** in **mainsail** measurement condition shall include all components of the **mainsail** that are attached to the **mainsail** before it is hoisted. Components of the **mainsail** that are attached to the **mainsail** during or after the hoist shall be included in the **platform measurement condition**.

19.19 After sailing, with the **mast** still stepped in the **yacht**, the **mainsail** shall be lowered completely below the top of the **mast lower zone** without assistance from anyone who is completely above that zone. As an exception, crew may go aloft to resolve occasional, unforeseen issues.

19.20 The **mainsail** shall be capable of being removed from the **mast**, with the **mast** stepped, without damage to either the **mast** or **mainsail**.

19.21 A **trip line** must not be used while racing.

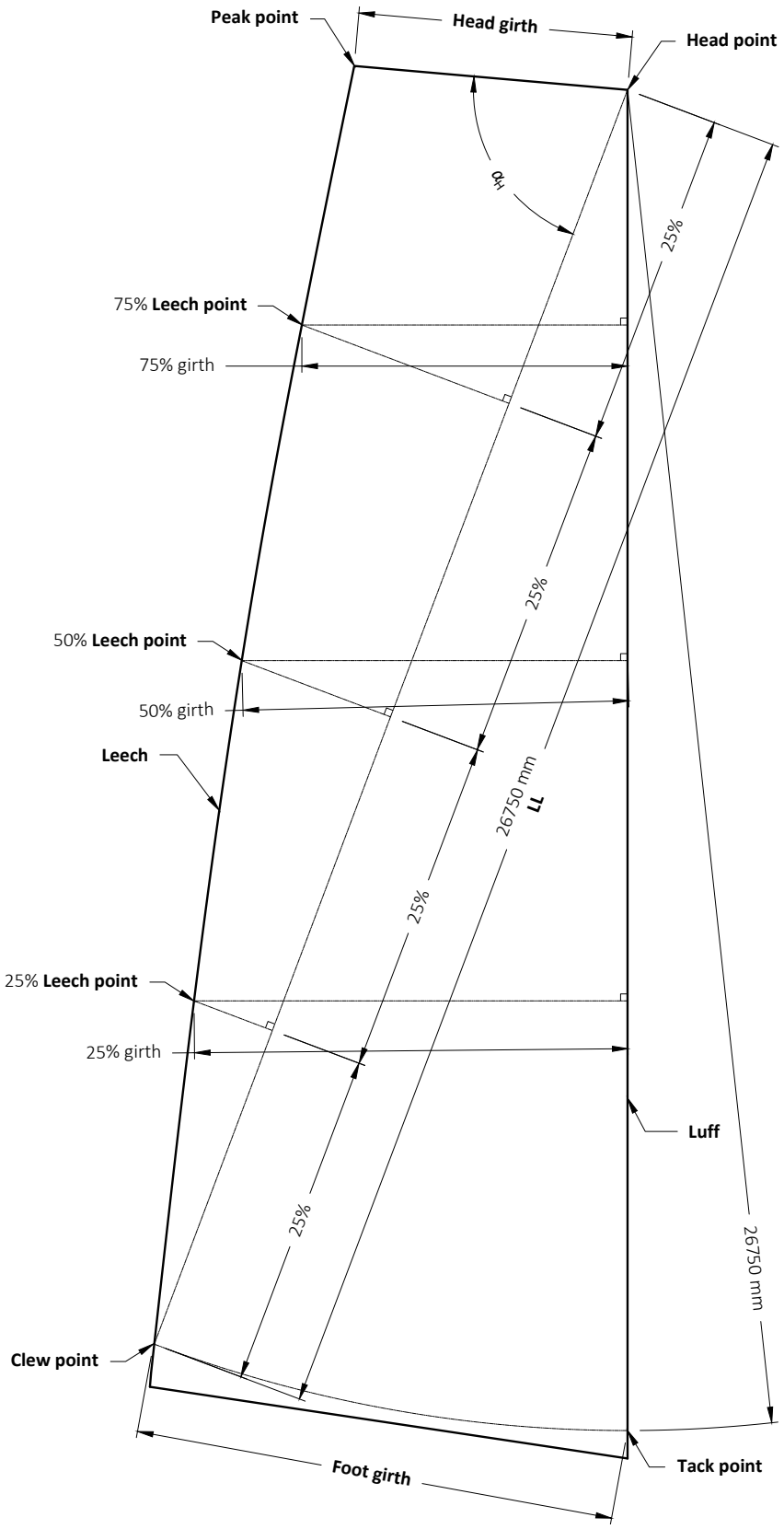

Figure 19.2: **Mainsail** Measurement

20 Jib

20.1 The components that may make up a **jib** are limited to:

(a) exactly one **sail skin**;

(b) up to 8 **battens**, which can terminate on any sail edge, and shall not be adjusted while the **jib** is hoisted;

(c) **sail hardware**;

(d) **luff** attachment devices permitted in Rule 20.8;

(e) **head pennants**;

(f) **luff**, **leech**, **head** and **foot** lines no greater than 6 mm in diameter and their associated purchase systems;

(g) ballast, that serves no purpose other than increasing sail weight, located within 1.0 m of the **tack point**; and

(h) **woollies**.

20.2 **Jib** girths, when measured ashore, shall not be larger than:

		Maximum
G_{LP}	**LP**	7.050 m
G_{50}	50% girth	0.59 · **LP**
G_{75}	75% girth	0.40 · **LP**
G_{H}	**Head girth**	0.17 · **LP**

20.3 **Jibs** shall comply with:

$$46.0 < \frac{\mathbf{LL}}{12} \times (3.3G_{LP} + 4.25G_{50} + 4.25G_{75} + G_{H}) < 75.0$$

For the avoidance of doubt, this formula is a girth restriction only and shall not be used as a measurement of sail area.

20.4 The largest dimension of any **sail hardware** for a **jib** shall not exceed 350 mm.

20.5 **Jibs** shall be hoisted and lowered without assistance from crew aloft. As an exception, crew may go aloft to resolve occasional, unforeseen issues.

20.6 The **head** of any **jib** shall be below **IG**.

20.7 **Jibs**, when hoisted, shall be connected to the forestay by hanks or luff pockets or a combination of both.

20.8 Hanks for connecting the **jib** to the forestay shall:

(a) extend no more than 75 mm forward of the **luff**, measured perpendicular to the **luff**;

(b) be no more than 100 mm in length, measured parallel to the **luff**; and

(c) be no closer than 200 mm to each other, except within 1.000 m of the **head point** or **tack point**.

20.9 Other than within 100 mm of **one-design rigging** terminals, **luff** pockets of **jibs** shall be:

(a) capable of being folded flat along the leading edge without sustaining damage; and

(b) no more than 150 mm wide, when measured internally with the pocket closed, perpendicular to the **luff**.

Luff pockets of **jibs** may extend up to 300 mm above the **head point** and such extensions will not be included in the evaluation of the **head**.

20.10 **Head pennants** shall be capable of being bent around a 300 mm radius without sustaining damage.

20.11 No component of the yacht shall be attached to, or bear upon a **jib** except:

(a) sheets, or purchase systems of sheets, attached within 400 mm of the **clew point**;

(b) a halyard in 1:1 configuration attached:

(i) within 400 mm of the **head point** of the **jib**; or

(ii) to the upper end of a **head pennant**, the lower end of that **head pennant** being attached within 400 mm of the **head point** of the **jib**;

(c) a Cunningham system near the **tack point**;

(d) the forestay;

(e) **luff**, **leech**, **head** and **foot** lines;

(f) the **hull upper**, which may be attached to the **jib** within 300 mm of the intersection of the **hull upper** and the forestay, and bear upon it elsewhere;

(g) small, static **hull upper** hardware (largest dimensions less than 100 mm) may bear upon the **jib** but may not be attached to the **jib**; and

(h) covers of the type described in Rule 8.5 may bear upon the **jib** but may not be attached to the **jib**.

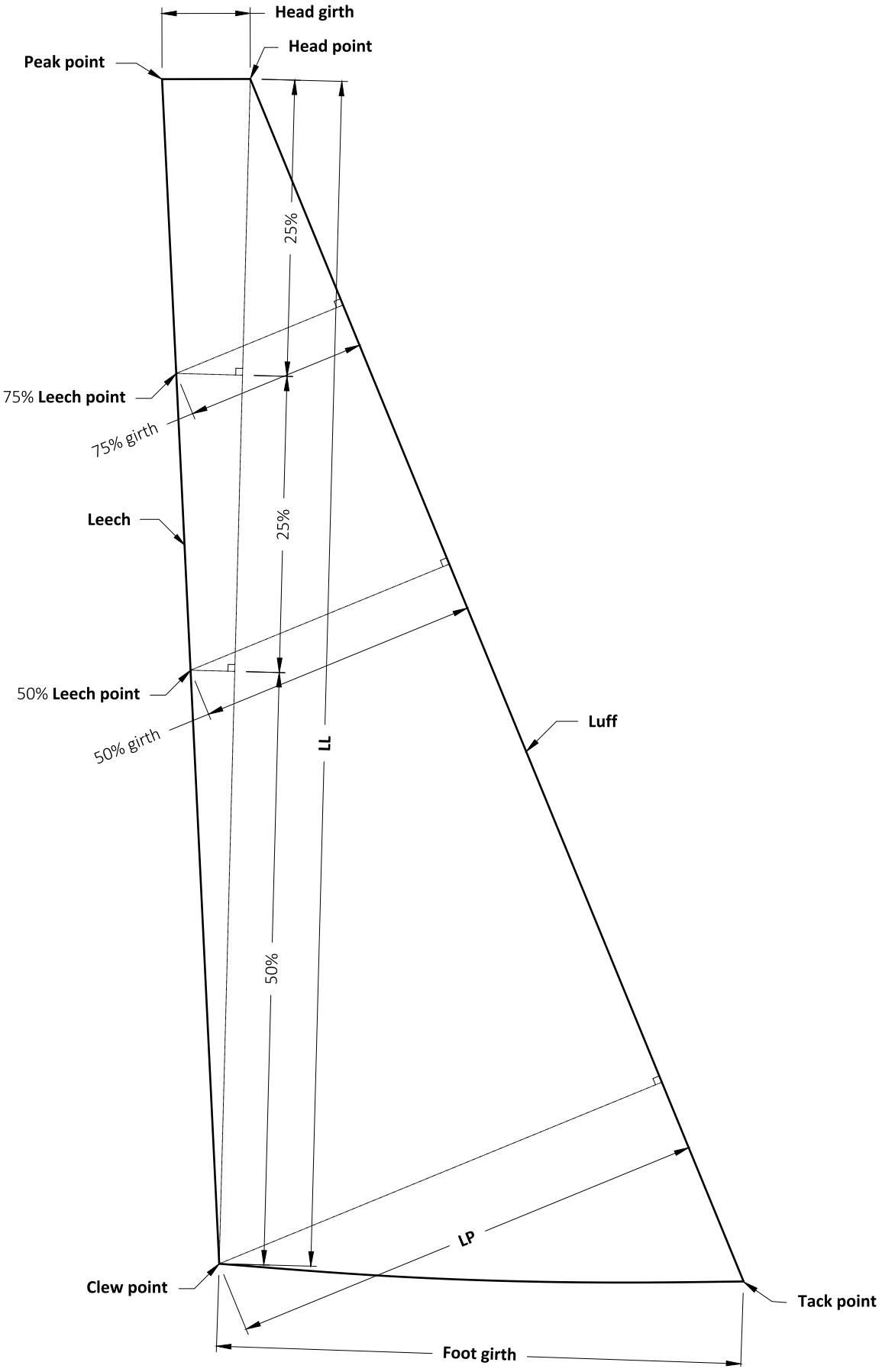

Figure 20.1: **Jib** Measurement

21 Hydraulic circuits

21.1 Only the following hydraulic circuits are permitted on the **yacht**:

(a) the hydraulic circuit within the **FCS**;

(b) the **AppendageHCC**, which incorporates:

(i) the **FlightHCC**; and

(ii) an optional **SteeringHCC**;

(c) the **RigHCC**; and

(d) any number of **LCSs**.

21.2 The **FCS**, **AppendageHCC** and **RigHCC** shall be entirely self-contained and disconnected from each other.

21.3 With the exceptions of Rules 21.1 and 21.2, Rule 21 applies to all components except the **FCS**.

21.4 Hydraulic circuits and components are permitted only as part of an **HCC** or an **LCS**. If a hydraulic system fulfils functions of an **HCC** as well as an **LCS**, it shall be considered an **HCC**.

21.5 Hydraulic circuits and components are permitted only for the purposes of:

(a) adjusting **control surfaces** with **control surface actuators**, including managing the flow of hydraulic fluid to and from these actuators; or

(b) cooling as part of an **LCS**.

21.6 Components in an **HCC** or an **LCS** must be sized appropriately for their permitted use. It is prohibited to use additional, oversized or highly-deformable components or plumbing:

(a) to control the mass distribution on the **yacht**;

(b) to act as a **yacht state** sensor;

(c) to store energy (except in permitted **hydraulic accumulators**); or

(d) for any purpose other than that permitted by Rule 21.5.

Reservoirs shall be no larger than required for supplying permitted **HCCs** and **LCSs**, including appropriate reserve volumes.

21.7 Standard pressure relief valves shall:

(a) be **one-design** components supplied by HYDAC with a model code of the form "DB4E-01X-xxxPyyy" or "DB4E-01X-xxxVyyy" where:

(i) "xxx" indicates the upper extent of the valve's pressure range;

(ii) "yyy" indicates the factory-preset opening pressure; and

(iii) if the "DB4E-01X-xxxVyyy" model is used, the lock nut shall be drilled through adjacent faces to enable a lock wire and lead seal to be installed;

(b) be set to open at a maximum pressure of 600 bar;

(c) be present in any circuit downstream of:

(i) the **AppendageHPS**;

(ii) the **RigHPS**;

(iii) the high-pressure **hydraulic accumulator** permitted by Rule 30.5 (a);

(iv) any **hydraulic actuator** chamber from which oil can be **recovered**; and

(v) any **hydraulic intensifiers** that are capable of increasing pressure (i.e. pressure intensifiers).

For each device (i) to (v) above, the pressure relief valve shall be located at any point within that part of a circuit downstream of the device that is always subject to the output pressure of the device; that is, before any other valves or restrictions; and

(d) vent to a **low-pressure circuit**.

This rule is a minimum requirement for pressure relief valves, and does not prohibit the use of additional pressure relief valves, nor the use of pressure relief valves of a different type elsewhere within an **HCC**.

21.8 **Hydraulic actuators** and **hydraulic intensifiers** are permitted to incorporate a gas spring return where:

(a) any gas volumes:

(i) shall contain a constant mass of gas, except for unintended leakage;

(ii) may be physically separate from the **hydraulic actuators** and **hydraulic intensifiers** they operate on; and

(iii) may be shared between **hydraulic actuators** and **hydraulic intensifiers**;

(b) any **hydraulic actuator** or **hydraulic intensifier** that:

(i) is capable of draining oil that can be **recovered**; or

(ii) contains gas which, when expanding, can do work on a **control surface**;

shall have a pressure relief valve on the gas volume set to open at a maximum pressure of 30 bar, which shall be manufactured by R. Conrader Company with model number SRV250; and

(c) the total swept volume of gas within **hydraulic actuators** and **hydraulic intensifiers** that satisfy Rule 21.8 (b), combining all such devices, does not exceed 6 litres.

21.9 **Hydraulic accumulators** cannot do work, or have work done upon them, via their **mechanical** connection to or contact with the **yacht**.

21.10 Pneumatic components shall not be used in **control systems**, except that gas may be used within an **HCC** where permitted by Rules 21.8, 26.3 and 30.5 (b).

21.11 Power supplied to a **valve** can do no work on a **control surface**, or on oil or gas within an **HCC**, except for incidental work such as the displacement of oil by the plunger, provided such work is insignificant in the context of overall power supplied to a **control surface**.

21.12 Components that have both hydraulic and electrical functions, such as **valves** and pressure sensors, shall be considered to be virtually split such that the hydraulic part is within an **HCC** or **LCS** and the electrical part is within an electrical circuit.

22 Actuators

22.1 **Hydraulic actuators** are permitted only within:

(a) **control surface actuators**;

(b) **hydraulic intensifiers**;

(c) the **AppendageHPS**; and

(d) the **RigHPS**,

where each **hydraulic actuator** may only be used in one of the above components.

22.2 A **control surface actuator** shall:

(a) be either:

(i) a linear actuator, which shall only do work in a direction parallel to its **ActuatorAxis**; or

(ii) a rotary actuator, which shall only do work in a direction about its **ActuatorAxis**;

(b) operate such that the relative position or rotation of those parts of the device which transmit load to the **yacht** shall be expressible by a single scalar value, excluding incidental movement in other degrees-of-freedom in which no work is done, such as the rotation of a piston within a cylinder;

(c) be designed and used only for transmitting load to or from **control surfaces** to control their position, orientation or deformation. It is prohibited for **control surface actuators** to be installed if their primary purpose is to measure the position, orientation or deformation of a **control surface**;

(d) be a part of one, and only one **HCC**; and

(e) shall not share parts with any other **control surface actuator**.

22.3 If a **control surface actuator** contains **hydraulic actuators** acting in parallel, the corresponding swept volumes of each **hydraulic actuator** shall have a direct connection to each other which shall not incorporate any **valves**.

22.4 Only the following **electric actuators** are permitted:

(a) **valves**;

(b) motors within the **AppendageEPS**, the **RigEPS** and the **FCS** power pack;

(c) **cooling devices** and bilge pumps that have no significant effect on the aerodynamic or hydrodynamic performance of the **yacht**; and

(d) devices within electrical circuits that affect only the circuits themselves, and have no other influence on a **control system** or the **yacht state**, such as CPU cooling fans and relays.

22.5 Except as permitted in Rule 22.4, an **ECC** must be incapable of having any significant effect on the **yacht state**.

23 Electrical circuits and batteries

23.1 Electric or electronic components or circuits are only permitted aboard the yacht as part of:

(a) **primary electrical circuits**;

(b) the **primary power supply**; or

(c) **secondary electrical circuits**, which are permitted only as part of:

(i) **media equipment** other than the **Media System**;

(ii) components supplied by the **Measurement Committee**;

(iii) devices for data and audio communication with **Competitors'** chase boats and shore bases, only as shown in Figure 35.1 and subject to Rules 35.12 and 35.13;

(iv) stand-alone **crew indication devices**, such as wristwatches, that are incapable of measuring or receiving any part of the **yacht state**;

(v) bilge pumps, smoke alarms and **cooling devices**, where permitted elsewhere in the **AC75 Class Rule**;

(vi) components used solely for the purpose of illumination, which do not indicate **yacht state** or convey any other information; and

(vii) components used when not racing, that when racing have been disconnected from all circuits and power sources to the satisfaction of the **Measurement Committee**, and when disconnected are incapable of providing any useful electrical or electronic function.

23.2 **COR/D-ACP** shall publish the specification of a **one-design** battery unit that will, when combined, form the **primary battery bank**. The **one-design** battery unit will have the following design targets:

(a) a nominal voltage of 48 V;

(b) provide diagnostic information and remote switching to the **CCS**, which can forward information to other **primary electrical circuits**;

(c) weigh no more than 25 kg per unit;

(d) fit through the **hull upper** hatch required by Rule 9.13;

(e) be contained within a fire-resistant case.

23.3 The **primary battery bank** shall comprise a number of identical **one-design** battery units, where:

(a) there shall be a minimum number of battery units on the **yacht**, which will be determined according to the specification to provide a capacity of 15 kWh;

(b) there is no maximum to the number of battery units a **yacht** may carry;

(c) all of the battery units shall be wired in parallel to a single point on the **yacht** (which may be a **one-design** bus bar), using **one-design** cabling of a specified length, to form a single battery bank;

(d) the **primary battery bank** shall lie entirely between planes 8.000 m and 13.500 m forward of **TRP**; and

(e) the **primary battery bank** must be located to allow **one-design** cabling to the **FCS** and **Media System** to be connected.

23.4 The **primary power supply** shall comprise:

(a) the **primary battery bank**;

(b) optional backup batteries with a total capacity of all such batteries combined not exceeding 260 Wh;

(c) optional DC-DC converters; and

(d) optional passive wiring, fuses, isolators, circuit breakers and connection hardware.

23.5 **Isolated** wiring for each of the systems listed in Rule 23.6 shall begin at the first junction after the **primary power supply**.

23.6 The **primary power supply** shall only power the following electrical systems:

(a) **primary electrical circuits**;

(b) **secondary electrical circuits**.

23.7 The only permitted power sources for electrical systems are the **primary power supply**, and local batteries, such as batteries within phones, which:

(a) have a capacity not exceeding 100 Wh per device; and

(b) no parallel combination of batteries should exceed 100 Wh.

23.8 The **media equipment**:

(a) may draw up to 20 A; and

(b) should be allocated at least 800 Wh per race

from the **primary battery bank**. This is subject to amendment and will be further detailed according to Rule 43.4.

23.9 Any DC-DC converters shall not increase the supply voltage to above 60 V.

24 Control inputs and proxies

24.1 The **AppendageECC** and **RigECC** are restricted to receive only the following sensor inputs:

(a) the sensor inputs permitted by Rules 26.5, 27.3, 28.4, 29.1, 31.4 and 32.5 for use in controlling specific power supplies and **control surface actuators**;

(b) the following additional inputs:

(i) the **internal state** of that **ECC**;

(ii) signals sent from the **CCS** via the **CAN bridge**;

(iii) the **internal state** of an **LCS** controlled only by that **ECC**;

(iv) the status of a float switch within a bilge pump;

(v) the ambient outside air temperature; and

(vi) the temperature, airborne particle density, or gas concentration within the **hull**.

24.2 Time, as supplied by the **Media System**, or as an internal clock within the **ECC**, may be used within all **control systems** within an **ECC**, whether or not it is explicitly permitted in any Rules that govern particular **control systems**.

24.3 Wherever a sensor measurement is a permitted input to an **ECC**, a **proxy** can also be used, provided it does not supply any additional useful information. For example:

(a) a linear displacement may be a **proxy** for a permitted angular rotation measurement;

(b) a pressure sensor at the outlet of an **AppendageHPS** may be a **proxy** for the pressure at the inlet of a **control surface actuator**, provided:

(i) there are no valves, restrictions or other means of changing the pressure, except normal pipe losses, between the two locations of the **AppendageHCC**; and

(ii) no additional useful information is gained by using a sensor located there rather than at the **control surface actuator** itself;

(c) a **foil flap** angle may be a **proxy** for the extension that forms part of the **internal state** of a **control surface actuator**, provided it does not supply additional useful information; but

(d) the measurement of a **foil flap** angle used to estimate the twist induced by hydrodynamic load is not a **proxy** for actuator extension; and

(e) sail twist is not a **proxy** for **mainsail** sheet load or extension.

24.4 Wherever a sensor measurement is a permitted input to an **ECC**, multiple direct measurements and **proxies** can be used, provided that:

(a) any additional measurements are used only to improve accuracy or reliability of a permitted measurement;

(b) the multiple measurements are processed to provide a single estimate of a measurement permitted by Rule 24.1 before being used in a **control system**; and

(c) the combination of measurements provides no useful information to the crew or to a **control system** beyond:

(i) that which would be supplied by an accurate and reliable measurement permitted by Rule 24.1; and

(ii) an indication of a sensor failure.

24.5 **Passive input devices** are restricted as follows:

(a) The electrical control signal produced by a **passive input device** shall relate only to a crew member's manual input. Neither the device nor the signal produced by it shall be significantly affected by the **yacht state**, except for unintended manual input caused, for example, by a crew member falling on to a button.

(b) No part of a **control system** shall:

(i) modify the limits of travel or operation of a **passive input device**;

(ii) physically aid a crew member to operate a **passive input device**; nor

(iii) control or provide any feedback to a **passive input device**.

24.6 Rules 24.1, 24.3, 24.4, 26.5, 27.3, 28.4, 29.1, 31.4 and 32.5 may be satisfied by a combination of the hardware and software used within a **control system**.

25 Crew Command System

25.1 Only the following sensors within, or inputs to the **CCS** are permitted:

(a) signals supplied by the crew via **passive input devices**;

(b) sensors that measure the angle of a **steering wheel** about its rotation axis;

(c) sensors that measure the **internal state** of the **CCS**;

(d) the **internal state** of the **primary power supply**; and

(e) status and diagnostic messages transmitted from the **FoilCantECC**.

25.2 The **CCS** shall be incapable of measuring any part of the **yacht state**, unless specifically permitted by Rule 25.1.

25.3 The **CCS** shall not directly affect **yacht state**, but is permitted to send commands through the connections detailed in Rule 35.

25.4 All data transmission between the **CCS** and the **RigECC** or the **AppendageECC** shall only be via a **CAN bridge**. The **CAN bridge** shall enforce data transmission restrictions by:

(a) permitting unidirectional data flow from the **CCS** to the **RigECC** and the **AppendageECC**; and

(b) prohibiting any data transmission between the **RigECC** and the **AppendageECC**.

25.5 **COR/D-ACP** shall publish the specification of the **CAN bridge**. It is envisaged that the system will:

(a) be a PCAN-Router Pro, Ixxat CANbridge NT 420, or similar device; and

(b) there will be no limit on how many **CAN bridges** may be used.

26 Appendage hydraulics

26.1 The **AppendageHCC** shall only comprise:

(a) the **AppendageHPS**;

(b) the **FlightHCC**;

(c) an optional **SteeringHCC**;

(d) pressure relief valves where indicated;

(e) high-pressure supply and low-pressure return lines; and

(f) inline passive devices such as filters, radiators, and connectors.

26.2 The **AppendageHCC** shall have the circuit layout indicated in Figure 26.1, with no additional branches or lines, where:

(a) there shall be a single **AppendageHPS** which shall provide one or two pressure supply ports; and

(b) the box labelled "PRV" indicates that a pressure relief valve is required downstream of each **AppendageHPS** pressure supply line.

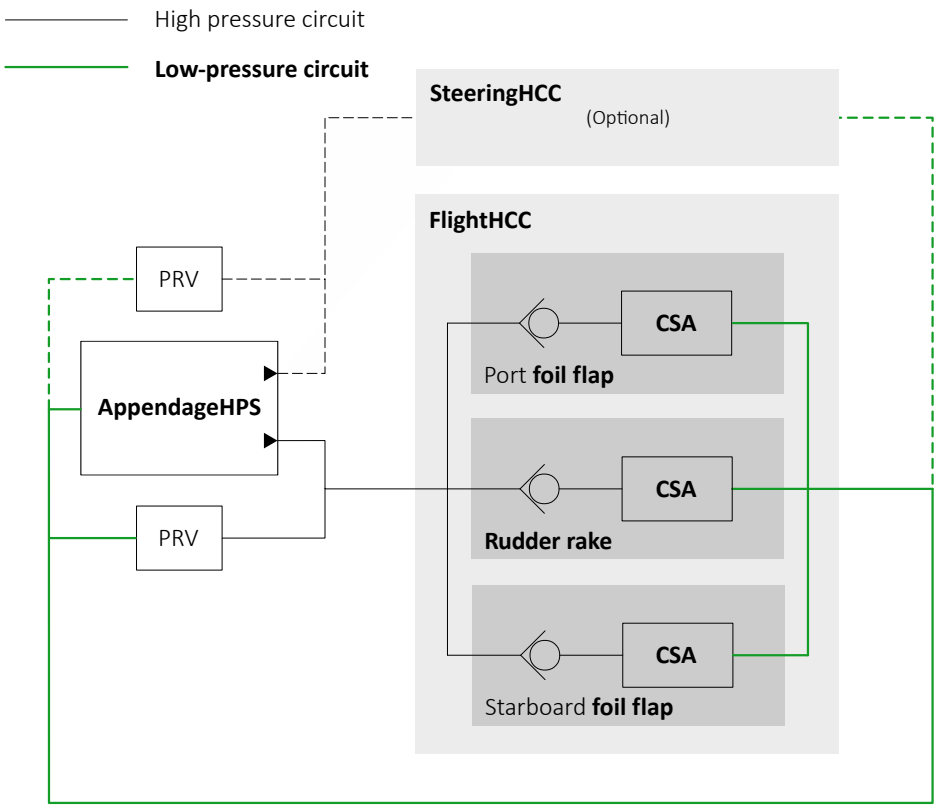

Figure 26.1: **Appendage HCC**

26.3 The **AppendageHPS** may comprise:

(a) **hydraulic accumulators**;

(b) **valves**;

(c) **hydraulic intensifiers**; and/or

(d) filters, radiators, lines and connectors.

26.4 Within Figure 26.1, the dashed lines indicate that the **SteeringHCC** is optional, as are its associated:

(a) **AppendageHPS** supply port;

(b) supply and return lines; and

(c) pressure relief valve.

26.5 Control signals sent to the **AppendageEPS** and to **valves** within the **AppendageHPS** may only be derived from:

(a) signals supplied by the crew via **passive input devices**;

(b) signals sent from the **CCS** via the **CAN bridge**;

(c) the **internal state** of the **AppendageECC**, including the **AppendageEPS**; or

(d) the **internal state** of the **AppendageHPS**.

27 Flight control system

27.1 The **FlightCS** shall only comprise:

(a) the **FlightHCC**;

(b) the **AppendageECC** (shared with the **SteeringCS**); and

(c) **mechanical** components.

27.2 The single **FlightDOF** of each **appendage** shall only be adjusted by:

(a) a single **control surface actuator** within the **FlightCS**; and

(b) **external forces** acting on that **appendage**.

27.3 Control signals sent to each **control surface actuator** within the **FlightCS** may only be derived from:

(a) signals supplied by the crew via **passive input devices**;

(b) signals sent from the **CCS** via the **CAN bridge**;

(c) the **internal state** of that **control surface actuator**; or

(d) the **internal state** of the **AppendageECC**.

Note that the **internal state** of the **AppendageECC** excludes information such as the strokes of other **control surface actuators**, which are part of the **yacht state**.

27.4 The **FlightHCC** shall only be powered by the **AppendageHPS**. It shall have the circuit layout indicated in Figure 26.1, with no additional branches or lines, where:

(a) a check valve to prevent reverse flow shall be present upstream of each **control surface actuator** (labelled "CSA"); and

(b) each **FlightDOF** shall be driven by a single **control surface actuator**;

(c) any combination of **valves** are permitted within each **control surface actuator** provided they are not prohibited by other rules; and

(d) no other components are permitted except inline passive devices such as filters, radiators, lines and connectors.

27.5 For the **control surface actuator** that drives each **foil's FlapDOF**, the following parts shall not intersect those regions of the **foil wing box** that lie more than 150 mm from the **foil's WSP**, when **projected** to **TRP**:

(a) any **valves** within it;

(b) any sensors measuring its **internal state**; and

(c) the swept volumes of its **hydraulic actuators**.

28 Steering control system

28.1 The **SteeringCS** shall only comprise:

(a) **steering wheels**;

(b) **mechanical** components; and

(c) optionally:

(i) a **SteeringHCC**; and

(ii) the **AppendageECC** (shared with the **FlightCS**).

28.2 The **SteeringDOF** shall only be adjusted by:

(a) the **mechanical** connection required by Rule 28.3;

(b) **control surface actuators** within the **SteeringCS**; and

(c) **external forces** acting on the **rudder**.

28.3 **Steering wheels** shall be **mechanically** connected to the **SteeringDOF** such that, except for elasticity and play in the connection, there shall be a fixed relationship, which need not be linear, between each **steering wheel** angle and the **SteeringDOF**. In addition, a **SteeringHCC** operating in parallel to this fixed relationship may assist the crew in controlling the **SteeringDOF**.

28.4 Control signals sent to each **valve** and **control surface actuator** within the **SteeringCS** may only be derived from:

(a) signals supplied by:

(i) the crew via **passive input devices**; or

(ii) the **CCS** via the **CAN bridge**;

provided they operate only in a discrete and occasional sense; that is, to adjust a setting;

(b) the angle of a **steering wheel** about its rotation axis;

(c) the torque applied to a **steering wheel** about its rotation axis;

(d) the **SteeringDOF** state;

(e) the torque about the **SteeringDOF** axis between the **rudder** and the **SteeringCS**;

(f) the **internal state** of **valves** and **control surface actuators** within the **SteeringCS**;

(g) pressures or temperatures within the **SteeringHCC**; or

(h) the **internal state** of the **AppendageECC**.

Note that the **internal state** of the **AppendageECC** excludes information such as the strokes of **control surface actuators** outside of the **SteeringCS**, which are part of the **yacht state**.

28.5 The **SteeringHCC**, if present:

(a) shall only be used to assist in the control of the **SteeringDOF**;

(b) shall only be powered by the **AppendageHPS**; and

(c) may contain any **control surface actuators**, **valves** and other hydraulic components not prohibited by other rules.

29 Rig electrical power system

29.1 **COR/D-ACP** shall develop a **one-design RigEPS** that will power the **RigHCC**. The system will:

(a) approximate the capability of four cyclors, whereby:

(i) a baseline power of 1200 W shall be available at all times;

(ii) an energy bank E, when not empty, will provide power in excess of the baseline power;

(iii) the energy bank will have capacity limits of:

$$0 \leq E \leq E_{max}$$

where:

$$E_{max} = (t_{er} \times 300)\ \text{J}$$

and t_{er} is the sum of the target race time and the time from the warning signal to the start, measured in seconds;

(iv) at the warning signal, the energy bank will be initialised to

$$E_0 = E_{max}$$

(v) the energy stored within the energy bank shall have a derivative:

$$dE/dt = \begin{cases} (1200 - P)\ \text{W}, & \text{if } t \leq t_{er} \\ (1500 - P)\ \text{W}, & \text{if } t > t_{er} \end{cases}$$

where P is the instantaneous power;

(vi) instantaneous power shall be limited by:

$$P \leq \begin{cases} 1200\ \text{W}, & \text{if } E = 0 \\ 3000\ \text{W}, & \text{if } E > 0 \end{cases}$$

(b) have a maximum output speed of 3000 rpm;

(c) have a maximum torque of 20 Nm;

(d) have the following inputs from the **RigECC**:

(i) target speed; and

(ii) enable; emergency stop;

(e) have the following outputs to the **RigECC**:

(i) motor speed; motor output torque;

(ii) motor current; supply voltage;

(iii) energy bank E; instantaneous power P; and

(iv) status flags of the motor controller;

and

(f) have a single output shaft for mechanical connection to the **RigHPS**, at which the above power P shall be measured or estimated.

The source code, algorithms, and state machine logic governing the available energy shall be published to all **Competitors**.

30 Rig hydraulics

30.1 The **RigHCC** shall only be powered by the **RigEPS**, via its **mechanical** connection to the **RigHPS**.

30.2 Pumps used within the **RigHPS** are restricted as follows:

(a) The only permitted pumps are those **one-design** radial piston pumps of type R and RG supplied by HAWE Hydraulik SE listed in the catalogues identified by HAWE as:

(i) "D 6010 – 09-2024 – 1.5", printed on 2024-10-10; and

(ii) "D 6010 D - 12-2024 - 1.1", printed on 2025-01-13.

(b) Pumps must be selected from the listed catalogue options, in terms of "Basic type", "Delivery flow coding", "Versions", "Seals" and "Supplement". Specifically, the "Delivery flow coding" must be selected from the tables in Section 2.2 of either catalogue, and may not be a "further combination" indicated in the catalogue as "available on request". No customised variations can be ordered, and each pump must be a standard order pump identified by the catalogue codes detailed in Section 2 of the catalogues.

(c) Pumps may not be modified from their supplied **one-design** condition, except:

(i) for maintenance and replacement of parts with identical spares in order to return a pump to its original condition; and

(ii) to reconfigure a pump from one catalogue configuration to another catalogue configuration, which must exactly match a configuration permitted by Rule 30.2 (b).

(d) **Competitors** must declare to the **Measurement Committee** the catalogue code of each pump they have installed on the **yacht**.

This Rule does not prohibit the use of **hydraulic intensifiers** downstream of the standard pumps.

30.3 The drivetrain connection between the **RigEPS** motor and each **RigHPS** pump shall be permanently connected; that is:

(a) it shall not be clutched in and out, such that turning the motor shall always have the effect of turning the same pump or pumps; and

(b) the ratio of the rotational velocity at the input to each **RigHPS** pump, divided by the rotational velocity at the **RigEPS** motor, shall be fixed for each pump and shall not be adjusted whilst racing.

30.4 **Hydraulic actuators**, hydraulic motors and **hydraulic intensifiers** that have a continuously variable displacement are prohibited within the **RigHCC**.

30.5 Energy may only be stored within the **RigHCC**:

(a) by one **one-design** high-pressure **hydraulic accumulator** with a maximum capacity (gas plus hydraulic fluid) of 2.0 litres, the specification of which is given by Rule 30.6;

(b) by gas in **hydraulic accumulators** within a **low-pressure circuit**, with a maximum gas pressure of 6 bar;

(c) by gas in **hydraulic actuators** and **hydraulic intensifiers** as permitted by 21.8; and

(d) as elastic energy resulting from the compression of hydraulic fluid, any entrained air and the expansion of plumbing, subject to Rule 21.6.

30.6 The high-pressure **hydraulic accumulator** permitted by Rule 30.5 (a) may be either:

(a) a **hydraulic accumulator** supplied by Cariboni S.r.l. with one of the following Cariboni part numbers:

(i) ACC A 2 29898;

(ii) ACC A 2 29905 (includes stroke sensor and gas valve);

(iii) ACC A 2 29909 (includes gas valve);

(iv) ACC A 2 30156; or

(b) one of the above models of Cariboni **hydraulic accumulator** modified as follows:

(i) the inside of the cylinder barrel may have a coating applied;

(ii) the piston seals and wear bands may be replaced with alternative seal and wear band designs; and

(iii) the piston may be modified by Cariboni, or replaced by Cariboni with a similar piston, to accept alternative piston seals and wear bands, provided that any modified design shall be approved by the **Measurement Committee** who shall verify that the modification is to permit seal and wear band changes only, and does not affect the **hydraulic accumulator** volume.

Athena have done some work on the fatigue life of this accumulator. This should be presented to Competitors.

31 Rig control system

31.1 The **RigCS** shall only comprise:

(a) **mechanical** components;

(b) the **RigHCC**;

(c) the **RigECC**; and

(d) the **RigEPS**.

31.2 **RigDOFs** are restricted to combinations of the following degrees-of-freedom:

(a) **mast** rotation permitted by Rule 17.14 (a);

(b) degrees-of-freedom of **control systems** that are only attached to or only bear upon the **mainsail** within the **mainsail lower zone**;

(c) **jib** sheet degrees-of-freedom, including car position; and

(d) **jib** Cunningham extension and retraction.

Each **RigDOF** shall be declared by a **Competitor** to the **Measurement Committee**, and must satisfy the definition of a **RigDOF**.

31.3 Except as permitted in Rule 31.5, the **rig** shall only be adjusted by the **RigCS**, within which each **control surface actuator**:

(a) shall be assigned, by declaration, to a single **RigDOF**;

(b) shall have the primary function of adjusting the declared **RigDOF**; and

(c) may influence other **RigDOFs**.

31.4 Control signals sent to the **RigEPS**, and **valves** within the **RigCS** shall be derived only from:

(a) signals supplied by the crew via **passive input devices**;

(b) signals sent from the **CCS** via the **CAN bridge**;

(c) the **internal state** of the **RigHPS**;

(d) the position, deflection or orientation degree-of-freedom declared as a **RigDOF** that has at least one **control surface actuator** assigned to it;

(e) **mast** rotation, whether or not it is declared as a **RigDOF**;

(f) loads applied by **RigCS** components to the **rig**, or to devices functioning as a **RigDOF**, such as **jib** sheet or car loads;

(g) **jib** halyard load measured by a load pin within the **jib** halyard lock;

(h) the **internal state** of **valves** and **control surface actuators** within the **RigCS**;

(i) pressures or temperatures within the **RigHCC**;

(j) piston positions or relative rotation angles within **hydraulic intensifiers** within the **RigCS**;

(k) fluid levels or piston positions within **hydraulic accumulators** within the **RigHCC**;

(l) the **internal state** of the **RigECC**; or

(m) the **internal state** of the **RigEPS**.

31.5 The following sail controls shall only be adjusted **mechanically** by the crew:

(a) the **leech line** of a **mainsail skin**;

(b) the **leech line** of a **jib skin**; and

(c) the **foot line** of a **jib skin**.

31.6 The only forms of energy storage and release permitted to adjust the **rig** are:

(a) the storage of elastic energy within the structure and **rigging** of the **yacht** and its:

(i) uncontrolled release as the structure and **rigging** returns towards its natural condition; or

(ii) controlled release and recovery via the **RigHCC**, where not elsewhere prohibited;

(b) the storage of a maximum of 75 J of elastic energy per system of springs or lines, and its controlled or uncontrolled release, where a system is a single spring or line, or a collection thereof that perform a specific function within the **RigCS**; and

(c) the storage of energy permitted by Rule 30.5, and its release into another part of the **RigHCC**.

32 Foil cant system

32.1 Details of the **FCS**, the system to control the **cant** rotation of the **foils**, are specified by the document referenced in Rule 43.3. When racing, the **FCS**, including its **FoilCantECC**, must be configured as required by the specification.

32.2 The **FCS** shall be installed in the **yacht** with the **cant** cylinder mounts and **foil cant** axes located as shown in Figure 12.2.

32.3 **Foil cant** shall only be physically controlled using the **FCS**:

(a) within the range 10° and 90°;

(b) to transition to a position permitted in (a), or to the foil's fully raised position (a position > 115°). This may include the crew cancelling the command for transition so the foil cant returns to a position permitted in (a) or to the foil's fully raised position (a position > 115°) provided this cancellation of the command for transition is no more than occasional; or

(c) within any range for safety reasons, e.g. to recover from a capsize.

32.4 The **FoilCantECC** will provide, using specified protocols:

(a) a port for communication with the **CCS**, where the **FoilCantECC** will:

(i) receive commands from the **CCS**;

(ii) transmit status and diagnostic messages to the **CCS**, including a status flag to indicate when a **foil** is in a fully raised position (within a tolerance detailed by the specification);

and

(b) a port for transmitting data to the **Media System**, where:

(i) the **Media System** will provide non-delayed channels to the **CIS** providing **foil** cant cylinder pressures, which will only be transmitted when the cant of both **foils** is no more than 90° as measured by the **FoilCantECC**; and

(ii) the **Media System** will provide all supplied **FCS** channels to the **ILS** for logging.

For the avoidance of doubt, the **FoilCantECC** will not transmit ram extension, ram pressure or **cant** angle to the **CCS**.

32.5 Control signals sent to the **FoilCantECC** to adjust **foil cant** shall only be derived from those allowed by Rule 25.1.

33 Instrumentation and logging system

33.1 The **ILS** shall:

(a) not be capable of having any significant effect on the **yacht state**; and

(b) not include any **crew indication devices** or devices which otherwise provide information to crew.

33.2 Only the following sensors within, or inputs to an **ILS** are permitted:

(a) strain and load sensors, subject to Rule 33.3;

(b) sensors that measure the **internal state** of the **ILS**;

(c) an input from the **Media System** as detailed in Rule 35.7; and

(d) sensors that measure the temperature, airborne particle density, or gas concentration within the **hull**.

33.3 Strain and load sensors within the **ILS**:

(a) shall only be capable of directly measuring strain or load:

(i) at the sensor location; and

(ii) transmitted through the primary load paths of the **hull**, **hull internals**, **appendages** and **mast**, and not for example within a pressure sensor;

(b) may include temperature sensors for thermal compensation;

(c) shall not be located on, nor measure strains within sails or **battens**;

(d) shall provide no **yacht state** information other than:

(i) load, strain, and quantities derived from those measurements; and

(ii) temperature where needed for compensation.

33.4 It is prohibited to measure the flying shapes of the sails or the deformed shape of the **mast**, except with strain gauges that lie entirely within the **mast tube**.

34 Display systems

34.1 The **CIS**:

(a) shall be incapable of measuring any part of the **yacht state**;

(b) shall not be capable of having any significant effect on the **yacht state**;

(c) may use short range wireless communication in **crew indication devices** and associated interface hardware (e.g. access points) for communication onboard the **yacht**, but must be configured to use only information available within the **CIS** permitted by Rule 35.8; and

(d) shall not include any devices which provide information to crew other than **crew indication devices**.

34.2 A **crew indication device**:

(a) must only provide visual and/or audio feedback to the crew; tactile or other non-audio-visual feedback is not permitted;

(b) must be incapable of measuring any part of the **yacht state**; and

(c) must be incapable of significantly affecting the **yacht state**.

34.3 Only the following sensors are permitted within a **CIS** or **crew indication device**:

(a) the state of user input controls on **passive input devices**;

(b) those sensors required to perform its permitted function, such as an ambient light sensor;

(c) Wi-Fi and Bluetooth transceivers, where permitted within the **CIS**;

(d) sensors that measure the **internal state** of the **CIS**; and

(e) sensors that measure the temperature, airborne particle density, or gas concentration within the **hull**.

34.4 A stand-alone **CCTV system** is permitted provided that:

(a) it comprises one or more cameras, one or more **crew indication devices**, cabling, and optionally **passive input devices**, power supplies, splitters, switchers and recording devices;

(b) cameras are installed either:

(i) in a **foil**; or

(ii) entirely below 1.700 m above **MWP**;

(c) images that are shown on **crew indication devices** during racing shall not be capable of being stabilised, mechanically or digitally, either by the camera or downstream of the camera, such that any image shown shall move only according to the part of the **yacht** to which the respective camera is attached;

(d) it is not capable of displaying (or communicating in another manner) any **yacht state** information beyond that which could be seen by the human naked eye; this does not preclude digitisation or global contrast enhancement of the video stream, but does prohibit the addition of overlays, edge detection, object recognition, the display of motion estimates of regions in the image, thermography etc.;

(e) a single **crew indication devices** may display images from multiple cameras, either simultaneously or by switching, but:

(i) each location on the **crew indication devices** may display only one camera image at a time, which means images must not be overlaid using transparency or blending; and

(ii) image switching must not occur at a frequency greater than 0.5 Hz, including resizing, repositioning or replacement;

and

(f) it shall not be capable of having any significant effect on the **yacht state**.

34.5 Any system or device which is required to be incapable of measuring or displaying **yacht state**, or incapable of wireless data transfer, may satisfy the relevant condition by either hardware limitations, or by an approved software solution, which:

(a) for a **crew indication device** could be an Android device with the relevant sensors or communication hardware disabled and locked by Samsung Knox management software; or

(b) for any device, may be a solution developed by a **Competitor** and approved by the **Rules Committee** following the process described by Rule 34.6.

34.6 A **Competitor** may seek approval to use a software solution to satisfy incapability requirements as follows:

(a) the **Competitor** shall lodge a **Rule Enquiry** proposing the software solution, which shall include:

(i) details of the hardware which the solution is applicable to;

(ii) a copy of the software executables;

(iii) a description of the mechanism by which the relevant hardware is disabled; and

(iv) a description of how the device can be locked by the **Measurement Committee**;

(b) if the proposed software solution is the result of a custom development, rather than being publicly available, the relevant **Competitor** shall also supply:

(i) the source code of the custom software, if available; otherwise

(ii) a declaration from the third party that developed the software, detailing its functionality and confirming that there are no back-doors available to any **Competitors**

(c) the normal **Rule Enquiry** process shall be followed, providing other **Competitors** with the opportunity to give feedback;

(d) the **Rules Committee** shall approve the software solution if they are satisfied that:

(i) the proposed solution adequately prevents access to the relevant hardware;

(ii) the proposed solution can be adequately locked by the **Measurement Committee**;

(iii) the process for installation and locking is not unreasonably complex; and

(iv) the software and installation process is readily available to all **Competitors**.

34.7 The **cockpit** for the **guest racer** shall incorporate a **crew indication device** that:

(a) has a display with a minimum diagonal of 8 inches;

(b) is clearly visible to the **guest racer**; and

(c) is configured to display **TRACI**.

35 Systems communication

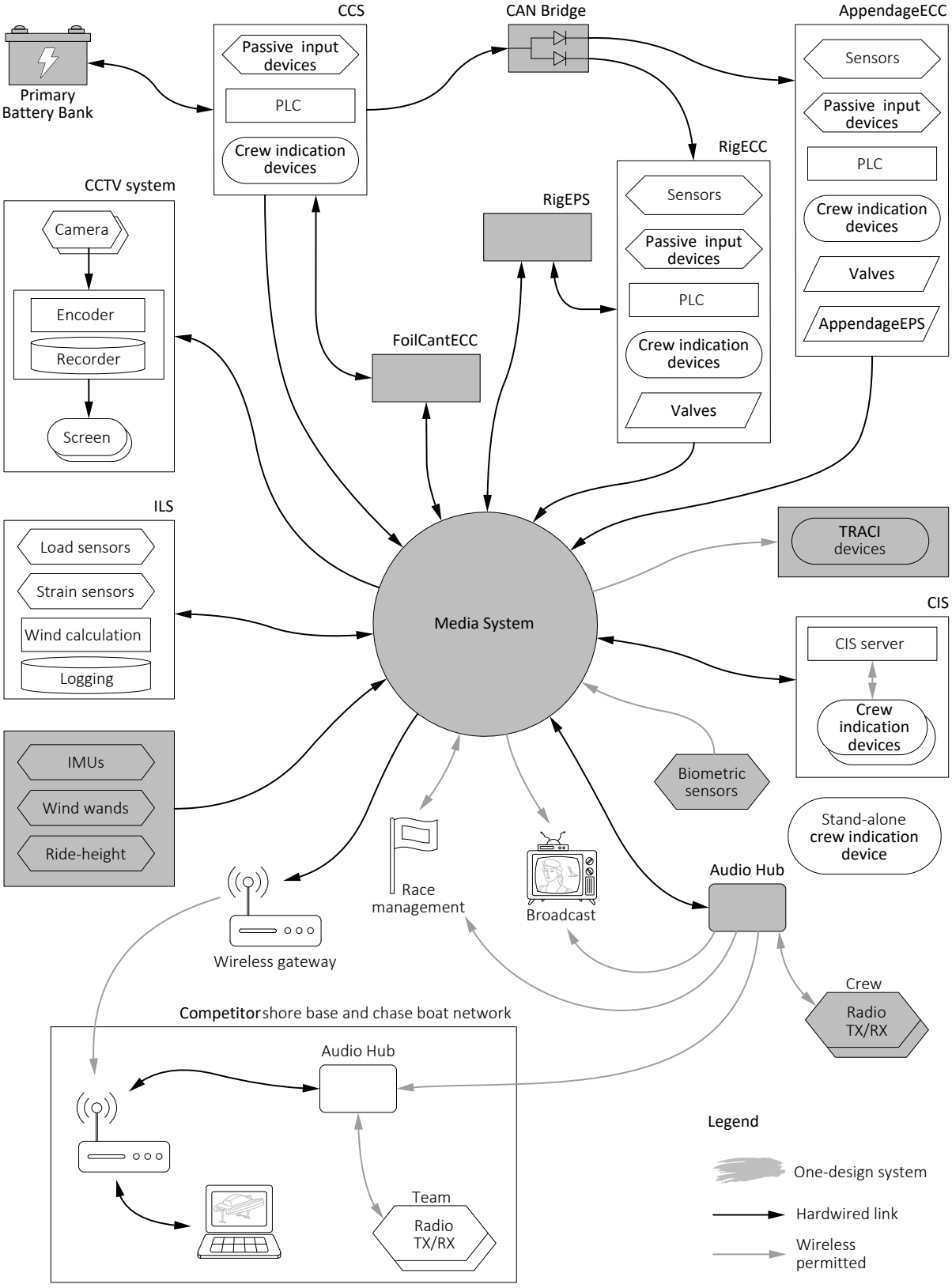

Figure 35.1: Permitted communication paths whilst racing

35.1 No information exchange between any electrical systems is permitted except as shown via specified communication arrows indicated in Figure 35.1, where:

(a) data transmission must be strictly one-way where indicated by directional arrows, although two-way protocols (e.g. acknowledge and retry) are permitted provided that no two-way information is exchanged other than that required to manage the communication channel; and

(b) a **one-design Media System** will provide communication between systems, where the specific implementation of this information exchange will be further detailed in the **Media System** specification referenced in Rule 43.4.

35.2 The communication pathways that can flow through the **Media System** are summarised below. The table is provided as an overview for convenience, and does not in itself grant any permissions or impose any restrictions.

	Rules	Source	Destination	Payload	Delay
(a)	32.4 (b) (ii)	**FoilCantECC**	**ILS**	All supplied channels	-
(b)	35.7 (a), 35.7 (b)	**ECCs**, **CCS**	**ILS**	**Competitor** data	-
(c)	35.11	**Media Equipment** clock	**Primary electrical circuits**	NTP	-
(d)	35.7 (e)	**Media Equipment** IMU	**ILS**	Lat/Long with time	30s
(e)	35.7 (c), 35.7 (d)	**Media Equipment** sensors	**ILS**	Wind wands, etc.	-
(f)	35.6	**ILS**	**Media System**	TWS/TWA, etc.	-
(g)	35.6	**AppendageECC**, **RigECC**, **RigEPS**, **CCS**, **ILS**, **CIS**	**Media System**	Accumulator pressure, rudder angle, etc	-
(h)	36.7 (b)	**TRACI**	**ILS**	All displayed data	30s
(i)	35.8 (a), 35.8 (b)	**AppendageECC**, **RigECC**, **CCS**	**CIS**	**Competitor** data	-
(j)	35.8 (c), 32.4 (b) (i)	**FoilCantECC**	**CIS**	Cant cylinder pressures	-
(k)	35.8 (d)	**ILS**	**CIS**	**Competitor** data	2s
(l)	35.9	**ILS**	**CIS**	Non-delayed alarms	-
(m)	36.7 (a)	**TRACI**	**CIS**	Subset of **TRACI** data	-
(n)	35.10	**CIS**	**Audio Hub**	Audio cues	-
(o)	35.13	**ECCs**, **CCS**, **ILS**, **CIS**	**Competitor** wireless gateway	**Competitor** monitoring	-
(p)	29.1 (a) (iv)	**Media System**	**RigEPS**	**RigEPS** reset	-

35.3 Communication between any systems on the **yacht** permitted by Rule 35.1 must be **hardwired** except where wireless communication is expressly permitted by arrows marked “wireless permitted” in Figure 35.1. Devices that have wireless capabilities must have this disabled to the satisfaction of the **Measurement Committee**.

35.4 Each **primary electrical circuit** shall have wiring that is **isolated** from other devices and systems, except for:

(a) connections shown in Figure 35.1; and

(b) connections from the **primary power supply** as permitted by Rule 23.5.

35.5 The following **primary electrical circuits** shall be **hardwired**, and hardware within these circuits shall be incapable of communication by any means other than **hardwired** information transfer:

(a) the **AppendageECC**;

(b) the **RigECC**;

(c) the **CCS**;

(d) the **CAN bridge**

(e) the **ILS**; and

(f) the **CCTV system**.

35.6 The combination of **AppendageECC**, **RigECC**, **CCS**, **ILS**, and **CIS** shall provide a data stream to the **Media System**, which:

(a) shall include data channels specified by:

(i) **AC Media** for broadcast, such as, but not limited to: true wind speed, true wind angle and true wind direction, **RigHCC hydraulic accumulator** pressure and **rudder** angle; and

(ii) the **Measurement Committee** for verification of compliance with the **AC75 Class Rules**, such as, but not limited to: **control surface** positions and crew inputs to **passive input devices**;

(b) shall be:

(i) the most accurate data available;

(ii) measured using **Competitor**-supplied sensors, unless the **media equipment** specification or the **Measurement Committee** specifies **one-design** sensors for certain measurements or permits certain channels to be estimated rather than measured; and

(iii) at the specified frequency;

(c) shall use a protocol to be specified in accordance with Rule 43.4; and

35.7 The **Media System** will transmit to the **ILS**:

(a) a non-delayed UDP data stream forwarded from any connected **ECC**;

(b) a non-delayed UDP data stream forwarded from the **CCS**;

(c) the following non-delayed data channels from any **one-design** fibre-optic gyro IMUs, wind wands and ride-height sensors:

(i) velocity components in a ground-fixed frame;

(ii) acceleration components in a yacht-fixed frame;

(iii) rotation rates in a yacht-fixed frame;

(iv) heading, heel, trim and their derivatives;

(v) IMU diagnostic or status information;

(vi) raw wind wand data;

(vii) ride-height sensor data;

(viii) altitude above water (if an altitude estimate is implemented within the **Media System**); and

(ix) a timestamp;

(d) a non-delayed estimate of tidal current velocity and direction; alternatively, **AC Media** may provide **Competitors** with a model with which they can compute these estimates; and

(e) Latitude and longitude channels delayed by approximately 30 seconds, transmitted with original timestamps so that the data can be re-synchronised for logging.

35.8 The **Media System** will transmit to the **CIS**:

(a) a non-delayed UDP data stream forwarded from the **AppendageECC** and **RigECC**;

(b) a non-delayed UDP data stream forwarded from the **CCS**;

(c) non-delayed **FoilCantECC** cant cylinder pressures, subject to Rule 32.4 (b) (i); and

(d) the UDP data stream forwarded from the **ILS**, delayed by approximately 2.0 s;

35.9 The **Media System** shall include a mechanism for sending non-delayed alarms from the **ILS** to the **CIS** where:

(a) the **Media System** will accept alarm event messages generated by the **ILS**, which may only contain:

(i) an alarm category ID code, being an integer between 1 and 10; and

(ii) a single floating point number representing the magnitude of an alarm value;

and

(b) the **Media System** will send the alarm message to the **CIS**, restricted while racing to:

(i) maximum total number of alarms of 20 per race; and

(ii) once dispatched for a particular category ID, will not be dispatched again for the same category ID for 10 seconds.

35.10 The **CIS** may transmit an audio cue message to the **Media System**, which on receipt, shall transmit a corresponding audio waveform to the **Audio Hub**. A library of waveforms shall be supplied in advance by the **ILS** to the **Media System**.

35.11 The **Media System** will transmit the time of day to all **primary electrical circuits** that are capable of receiving it, from an NTP server synchronised by GNSS.

35.12 The **Audio Hub** will provide:

(a) audio communication between the **Media System**, the crew, **Competitors'** chase boats, shore bases, race management, and broadcast; and

(b) an audio recording accessible to the **Competitor** after racing.

35.13 The **Media System** will use UDP forwarding to send data, which may be rate-limited, from **ECCs**, the **CCS**, **ILS** and **CIS** to a **Competitor**-supplied wireless gateway, which can provide wireless data transmission to a **Competitor's support vessel** and shore network. The link can also be configured to include an encoded audio stream from the **Audio Hub**.

35.14 When not racing, the **Media System** will open communications ports between the **ECCs**, **CCS**, **ILS**, **CIS**, **CCTV System** and the **Audio Hub**, and provide a test mode for **Competitors** to test the race configuration. The **Media System** will broadcast a flag to connected systems to indicate whether or not it is in race mode.

35.15 In the event of electrical or radio interference:

(a) between a **Competitor's** systems and **media equipment**; or

(b) between one **Competitor's** systems and another **Competitor's** systems

Competitors will work with **AC Media** to find a practical solution, to the satisfaction of the **Measurement Committee**. If necessary, **AC Media** in conjunction with the **Rules Committee** may stipulate frequency bands within which **Competitors** must or must not operate.

36 Tactical race and course information

36.1 **COR/D-ACP** will supply the **one-design TRACI** system to **Competitors** comprising software, displays, and other hardware components.

36.2 At all phases of a race, **TRACI** will display

(a) true wind speed and true wind direction;

(b) a mechanism for identifying wind shifts;

(c) a map visual identifying the position of the **Competitor's yacht**;

(d) other **Competitor's** locations if available;

(e) race course boundary and race course boundary zones;

(f) time-to-boundary in the direction of travel;

(g) distance to the nearest boundary; and

(h) mark and mark zones.

36.3 In a Match Race, whilst time-to-entry is greater than zero, **TRACI** will display:

(a) time-to-start and time-to-entry;

(b) start line bias;

(c) time-to-kill to entry, sailing a minimum distance;

(d) time-to-kill to entry, at the entry mark;

(e) upwind laylines on both tacks, to both ends of the start line;

(f) a downwind layline with one boundary gybe to the entry end; and

(g) course information (axis, length, start box width).

36.4 Prior to a **Competitor** starting, but when Rule 36.3 is not applicable, **TRACI** will display:

(a) time to start;

(b) start line bias;

(c) time-to-kill to:

(i) both ends of the start line;

(ii) the start line given an optimal VMG path; and

(iii) the start line via the leeward layline;

(d) time to the leeward layline;

(e) perpendicular distance to the start line;

(f) upwind laylines on both tacks, to both ends of the start line; and

(g) course information (axis, length).

36.5 After a **Competitor** has started, **TRACI** will display:

(a) time to the opposite boundary;

(b) time remaining on each tack if sailing at VMG angles;

(c) laylines to the next marks, continued along the course, assuming boundary manoeuvres;

(d) race information (time since start, course axis and number of legs remaining); and

(e) gate bias.

36.6 Prior to racing, **Competitors** may configure **TRACI** by supplying performance parameters required to tune the timing predictions to their yacht. This may include, but is not limited to:

(a) velocity polars;

(b) accelerations parameters; and

(c) manoeuvre parameters.

It is prohibited for **Competitors** to modify **TRACI**, or to reconfigure it during racing.

36.7 **TRACI** shall provide:

(a) the following data, only, as a non-delayed stream to the **CIS**:

(i) timing information described in Rules 36.3, 36.4 and 36.5;

(ii) speed over ground (SOG) in metres per second;

(iii) true wind speed (TWS) in metres per second, rounded to one decimal place; and

(iv) course wind angle (CWA) in degrees, where CWA is the course over ground (COG) subtracted from the true wind direction (TWD); and

(b) all displayed numerical values and racecourse information to the **ILS**, delayed by 30 seconds, with the original timestamps so the data can be re-synchronised for logging.

36.8 **COR/D-ACP** will supply hardware to display the **TRACI** software within each **cockpit**, where:

(a) **Competitors** may choose where the display hardware is located, and how it is oriented;

(b) the application will support portrait and landscape orientations; and

(c) hardware required by the **TRACI** system shall be classified as **one-design media equipment**.

36.9 **TRACI** shall support a mechanism for **Competitors** to use the system for training purposes outside of racing. This shall include, but is not limited to, the ability to:

(a) set and adjust racecourses, start times and entry sides;

(b) see the **Competitor's** live position relative to the set racecourse;

(c) see the live position of the **Competitor's** GPS tracked marks if available; and

(d) forward the data to the **CIS** and **ILS** as defined in Rule 36.7.

36.10 **TRACI** may incorporate screen-recording functionality.

36.11 It is prohibited for any non-**one-design** system to estimate the latitude, longitude, relative position, or timing-related information:

(a) relating to:

(i) the **Competitor's** own **yacht**;

(ii) any other **yacht**;

(iii) any feature of the course, such as marks, boundaries, zones or lines; or

(iv) any other features, whether real or virtual, stationary or moving;

(b) whether information to generate those estimates is based on:

(i) data provided in Rule 35.7, 35.8 or 36.7;

(ii) sensor data;

(iii) data supplied by human input devices; or

(iv) any other source.

37 Media equipment

37.1 The Rules in this section define the most significant design constraints imposed in order to accommodate the **media equipment**. Additional requirements shall be detailed by the **media equipment** specification documentation referenced by Rule 43.4.

37.2 **Media equipment** includes, but is not limited to:

(a) a **Media System**;

(b) an **Audio Hub**, subject to Rule 35.12;

(c) a **media bowsprit**, including:

(i) a wind wand;

(ii) a ride-height sensor; and

(iii) possibly radiators for cooling the **FCS** and **Media System**;

(d) an IMU fixed to the **hull**, and a second IMU near the masthead, both capable of measuring rotation;

(e) an **aft media post**;

(f) a masthead unit, including:

(i) antennae;

(ii) a wind wand; and

(iii) cameras;

(g) cameras and microphones;

(h) hardware for the **TRACI** software as detailed in Rule 36;

(i) brackets or other mounting devices;

(j) cabling; and

(k) cable management hardware.

37.3 The wind wands specified in Rule 37.2 shall be selected by **AC Media** in consultation with **Competitors** and shall be a:

(a) B&G model WS310;

(b) A+T 500 series; or

(c) another wand that provides similar or greater accuracy.

37.4 The areas shown in Figures 37.1, 37.2 and 37.3 shall be reserved for the **media equipment**. Additional reserved areas for cameras, microphones, sensors, processors, cabling and batteries shall be detailed in the **media equipment** specification, and may include (as a non-exhaustive list):

(a) locations in the **hull** to house cameras providing a view of the **foils**;

(b) locations in the **cockpits** to house cameras providing a view of the crew;

(c) locations in the **foil arms** to house cameras providing views of the **hull**;

(d) an increase in the size of the reserved area around the **aft media post**; and

(e) an increase in the size of the reserved area at the masthead.

37.5 The reserved area for the internal **media equipment** hold, shown in Figure 37.1, shall have an additional clearance volume around the hold which is defined by:

(a) an extrusion in the x-direction of the forward face of the cuboid by 700 mm; and

(b) an extrusion of 375 mm of the planes parallel with **LCP** away from **LCP**.

This additional volume may be shared with **Competitor** equipment subject to the approval of the **Measurement Committee** and **AC Media**.

37.6 As an exception to Rule 37.4, **AC Media** shall permit **Competitors** to install communications antennae within the aft-most reserved area shown in Figure 37.1 on the **aft media post** as further detailed in Figure 37.4.

37.7 The **hull** shall be fitted with interfaces specified by the **media equipment** specification documentation for the attachment of the:

(a) **Media System** and associated **media equipment**;

(b) **aft media post**; and

(c) **media bowsprit**.

Drawings of the **media equipment** provided in this section are indicative only, and unless otherwise specified, may be different from the equipment finally supplied.

37.8 The mounting surfaces for the **aft media post** and **media bowsprit** shall be submitted to the **Measurement Committee** for approval.

37.9 A schematic of the **aft media post** is shown in Figure 37.4, where:

(a) the indicated mounting details are a final specification and will not be changed;

(b) the requirement for the mounting surface to be parallel to **MWP** only applies during **platform measurement condition**, with a build tolerance of ± 0.5 degrees; and

(c) with a 10 kg side load applied at the camera mount plate, the maximum displacement at that location shall be 8 mm.

37.10 Cooling radiators for the **Media System** and the **FCS** shall be located on the **aft media post**. Details of the cooling circuit for the **FCS** are provided in the **FCS** specification.

37.11 **Media equipment** shall in general be installed by **AC Media**, but some parts of the installation may be the responsibility of the **Competitor**, to be further detailed in the **media equipment** specification.

37.12 The **media equipment** specification will set out, for each piece of equipment, where responsibilities lie between **AC Media** and the **Competitor** for connectivity, maintenance and testing. The cost of replacement **Media Equipment** components that have been damaged whilst sailing, or by a **Competitor's** team members, shall be bourne by the **Competitor**.

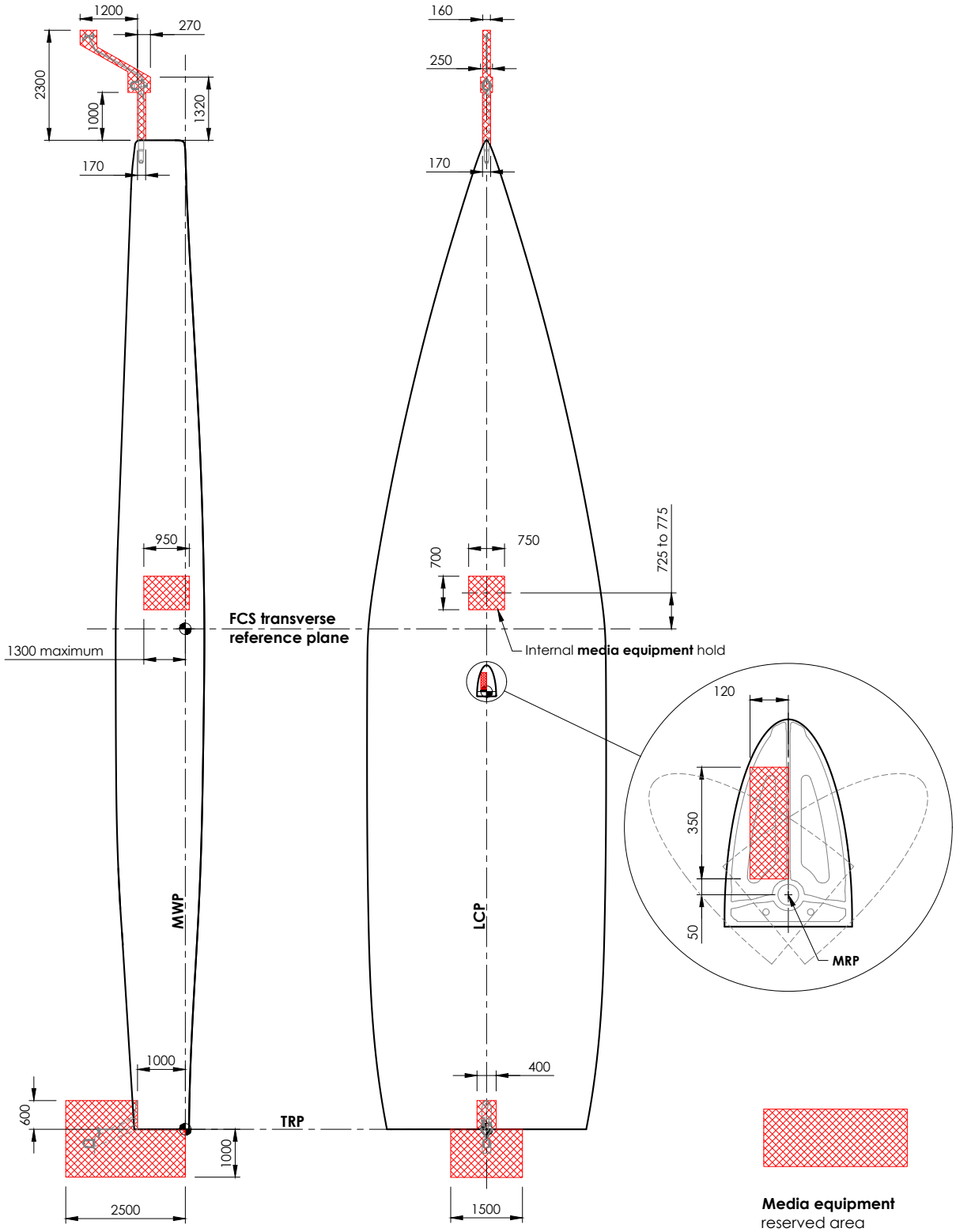

Figure 37.1: Reserved areas for **media equipment**

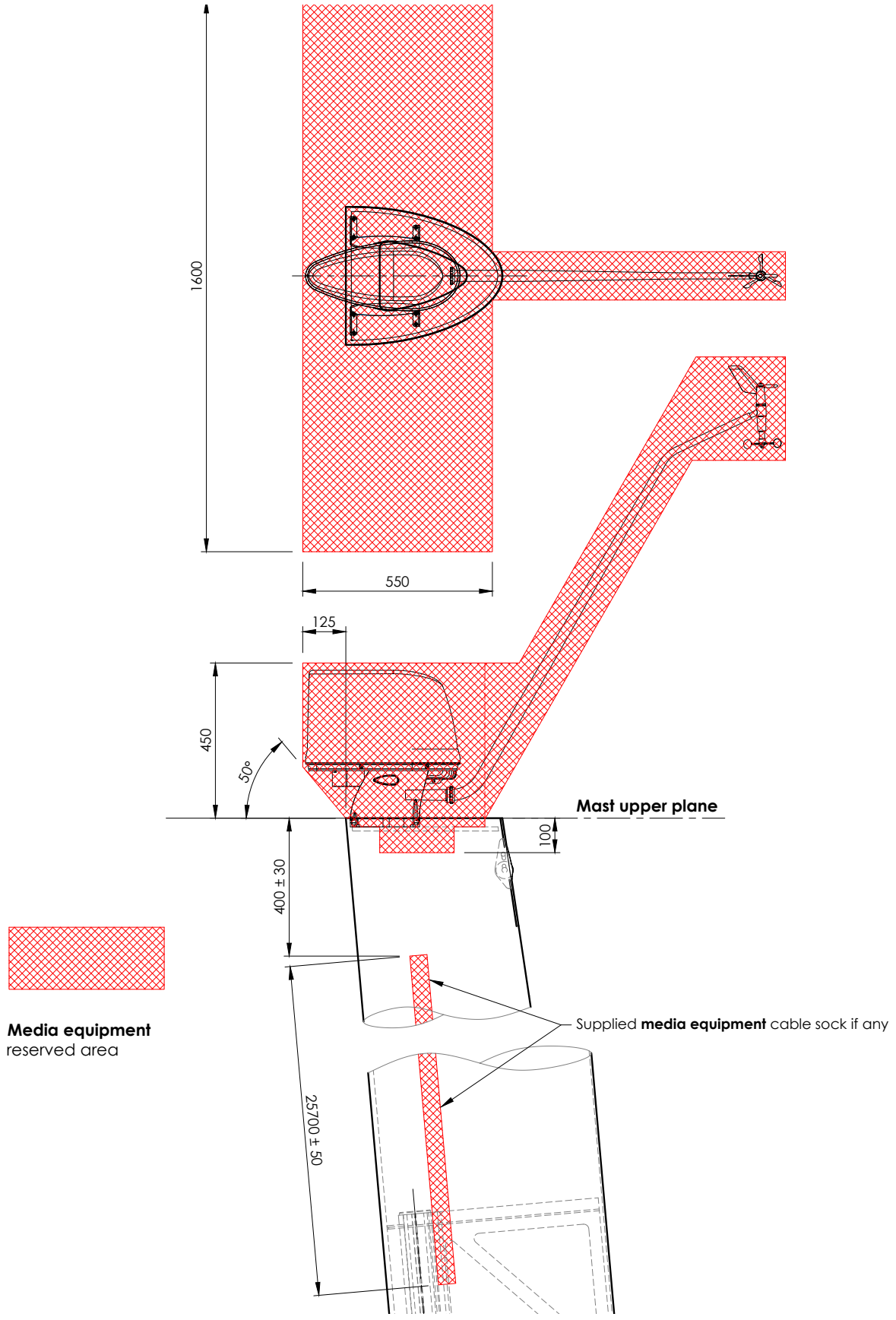

Figure 37.2: Reserved areas for **media equipment on the mast**

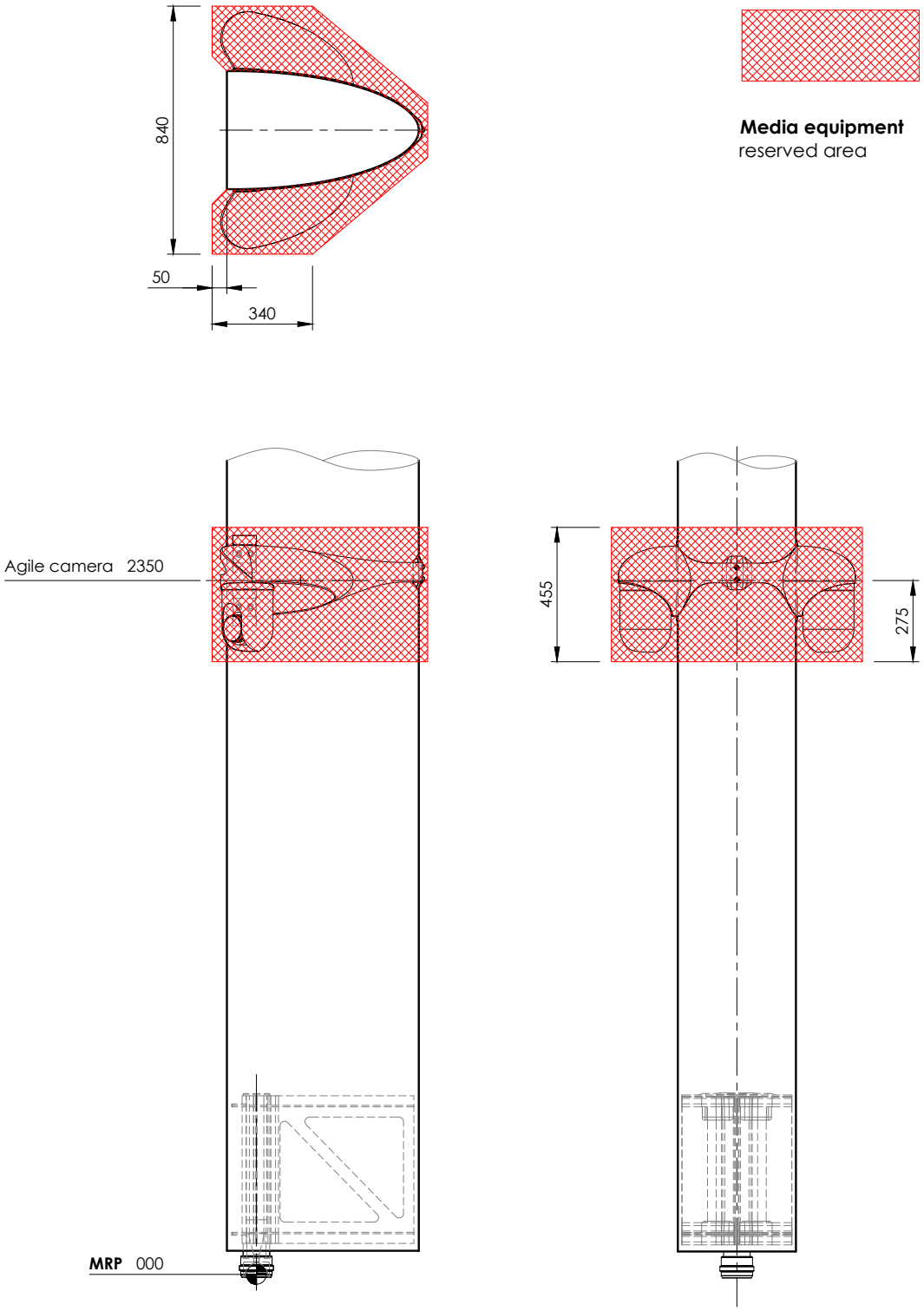

Figure 37.3: Reserved areas for **media equipment on the mast**

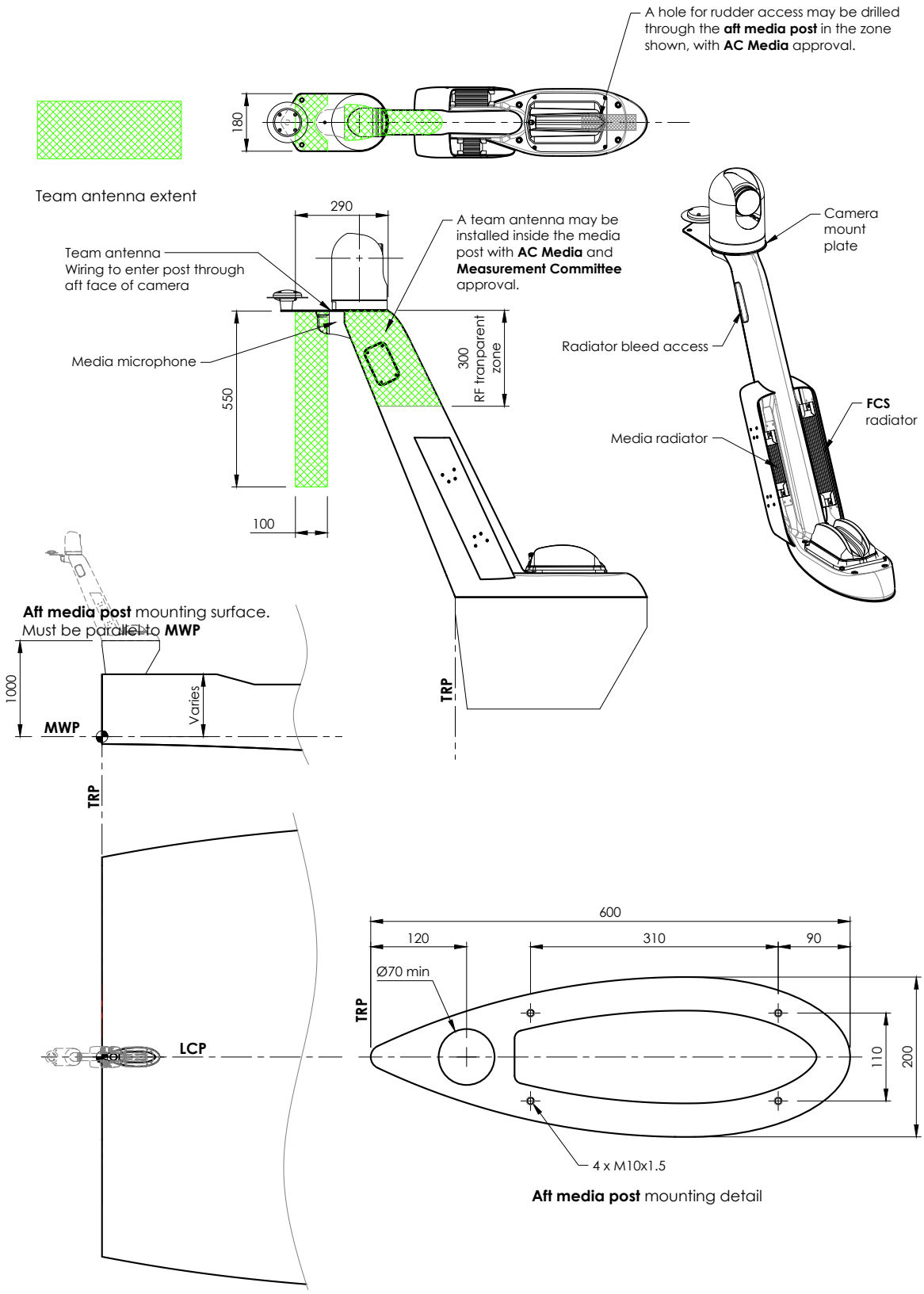

Figure 37.4: **Aft media post mounting details and areas reserved for team antenna**

38 Branding

38.1 Areas shall be reserved for **event** branding and country flags on the **jib**, **mainsail** and **mast tube**. No advertising, other signage or graphics shall be affixed within these areas.

38.2 On the outward facing sides of both **mainsail skins**, an area shall be reserved encompassing the area within 6600 mm of the **mast upper plane** within the extents of the **sail skin**.

38.3 The **mainsail event** branding shall not restrict sail girth measurements. If **event** branding does not fit on a particular sail then the **Competitor** shall notify the organising authority who will mandate an alternative branding arrangement for the sail.

38.4 On both sides of the **jib**, an area defined by a radius of 2800 mm centred on the **tack point** shall be reserved.

38.5 On both sides of the lower panel of the **mast tube**, an area between the agile camera and the spreader shall be reserved.

38.6 Details of the content for the reserved areas shall be provided in the document referenced by Rule 43.4.

39 Crew

39.1 There shall be five crew members, unless reduced by accident, of which:

(a) at least one shall be female; and

(b) all shall be human beings.

39.2 Crew members, the **guest racer** and **carried equipment** shall be weighed prior to racing, in accordance with the **Measurement Procedures**. The **Measurement Committee** will use the latest recorded weights to calculate ballast as required by Rule 6.10 and 6.11.

39.3 Each crew member shall wear:

(a) a buoyancy aid that meets the flotation standard of ISO 12402-5 or ISO 12402-6 (CE 50 Newtons) and that is capable of being removed or deflated in the water within five seconds;

(b) a helmet that:

(i) meets a minimum standard of CE EN 1077, CE EN 966, ASTM 2040, or Snell S-98;

(ii) fits entirely within an ellipsoid whose principal axes have lengths of 300 mm, 300 mm and 400 mm;

(iii) does not obstruct the crew member from using their personal air supply, to the satisfaction of the **Measurement Committee**;

(iv) has at least 300 cm^2 of the exterior surface brightly coloured; and

(v) when placed on a flat surface with the neck opening facing downwards, at least 100 cm^2 of the brightly coloured region is visible when viewed in parallel perspective from all angles above the surface and aft of a transverse plane through the centre of the helmet;

(c) at least one personal air supply that:

(i) contains compressed air equivalent to at least 40 litres uncompressed volume;

(ii) has a mouthpiece mounted near the crew member's shoulder; and

(iii) does not require the use of hands when in use;

(d) a pocket for carrying **crew media equipment** with minimum dimensions 80 mm x 200 mm x 30 mm; and

(e) **crew media equipment**.

39.4 Helmets required by Rule 39.3 (b) may have additional requirements prescribed by **AC Media**, including:

(a) the integration or attachment of a supplied in-helmet or helmet-mounted camera; and

(b) a quick-connect auto-release cable connection to the **yacht** for broadcast purposes.

39.5 The total mass of **carried equipment** may not vary after being weighed by the **Measurement Committee**, except:

(a) on-board food and drink included in **carried equipment** may reduce in mass during the race by 2.5 kg; and

(b) water absorption of no more than 3.0 kg in excess of the dry maximum when soaked and allowed to drain for 1 minute.

39.6 Any **carried equipment** brought aboard by a crew member must be worn or carried by that crew member at all times when racing.

39.7 **Carried equipment** shall not be designed to retain water for the purpose of increasing mass.

39.8 **Carried equipment** shall:

(a) not be designed to provide aerodynamic fairing of any part of the **yacht** or crew, except a crew member's face; and

(b) not exhibit any geometric features that extend its shape beyond that which is necessary for any permitted function.

39.9 Crew shall not enter the watertight volume of the **hull**.

39.10 In any normal sailing condition whilst foiling, no part of the crew shall be between the **skins** of the **mainsail**, or a region between the vertical extension down from the **foot** of each **mainsail skin**, other than:

(a) to resolve unforeseen issues; or

(b) by accident.

39.11 Each crew member shall remain within their own designated **cockpit planform**, except for:

(a) when they need to resolve unforeseen issues;

(b) when they are thrown out of a **cockpit** by accident; or

(c) their hands and arms, which may enter and exit the **cockpit planform** at their discretion.

Crew shall return to their **cockpit** as soon as any issue is resolved.

39.12 When leaving a **cockpit** to resolve an unforeseen issue, any crew that goes forward of a plane 10.0 m forward of **TRP**:

(a) must be tethered to the **hull**, or a fitting attached to the **hull** which can withstand the same load as the tether; where

(b) tethers shall comprise a harness and safety line that complies with ISO 12401, the safety line being no longer than 2 m; and

(c) such **hull** fittings and tethers are not required by **Competitors** who elect to never go forward of the 10.0 m plane while racing.

39.13 **Competitors** shall demonstrate to the satisfaction of the **Measurement Committee** that each crew member can move from their normal sailing position within their **cockpit** to a position completely outside the **perimeter line** of the yacht within 5 seconds:

(a) with all other crew members remaining in their **cockpit**; and

(b) with all crew members moving to a position outside the **perimeter line** of the **yacht** at the same time.

39.14 **Competitors** shall demonstrate to the satisfaction of the **Measurement Committee** that two crew members (the *rescuers*) can aid any unconscious crew member in their **cockpit** (the *casualty*), where:

(a) the following tests shall be completed, each within 15 seconds:

(i) moving the *casualty* to a position completely outside the **perimeter line** of the **yacht**;

(ii) supplying emergency air and disconnecting any devices that strap, clip, or otherwise connect the *casualty* to the **yacht**; and

(iii) disconnecting any devices that strap, clip, or otherwise connect the *casualty* to the **yacht**, without movement of their neck or spine;

(b) the starting point for the *rescuers* shall be the **platform upper surface** of the **yacht** close to the *casualty* but completely outside the **cockpit**;

(c) the **Competitor** shall select the *rescuers*; and

(d) the *casualty* shall be a manikin, which:

(i) shall be supplied by Ruth Lee Ltd, with the model code "RLN100RBR", described as a "100kg Duty Range Manikin with facemask and soft feet";

(ii) shall be strapped, clipped or otherwise connected to the **yacht** as the crew member would be in their normal sailing position; and

(iii) shall be wearing the **carried equipment** normally worn by the equivalent crew member.

(e) Handles, straps or other lifting arrangements on the *casualty* may not be used in the tests prescribed by Rule 39.14. Handles, straps or other lifting arrangements on the **carried equipment** worn by the *casualty* may be used, provided it is the same **carried equipment** normally worn by the crew while racing.

39.15 Each test prescribed by Rules 39.13 and 39.14 shall be satisfied:

(a) with the **yacht**, without sails, moored alongside a pontoon with approximately zero heel angle. A second pontoon may be used on the opposite side of the **yacht**;

(b) with any devices to strap, clip, or otherwise connect a crew member to the **yacht** in their **cockpit** engaged at the start of the test;

(c) without the removal or movement of any part of the **yacht**, except parts that strap, clip or otherwise connect a crew member to the **yacht**, or parts of mechanisms used to effect a release of those connections; and

(d) for any possible orientations of **steering wheels** required by the **Measurement Committee**, thereby simulating a situation where the **steering wheels** cannot be moved or rotated.

40 Guest racer

40.1 At the discretion of the **Regatta Director**, a **Competitor's yacht** may carry a **guest racer**, whose mass shall be limited and equalised according to Rule 6. If a **guest racer** is not aboard, equivalent ballast shall be included as per Rule 6.11.

40.2 A **guest racer** shall not contribute to the racing of the **yacht** in any way, including but not limited to:

(a) using any **passive input device** or otherwise altering the **yacht state**; and

(b) transmitting any race-related information, verbally or otherwise, to any crew member.

40.3 The **guest racer** shall not be a Team Member, as defined by the **Protocol**, except where the individual is the Team Principal or holds a similar title, provided that they:

(a) are the most senior Team Member of the **Competitor**; and

(b) have not sailed on an America's Cup yacht in any race forming part of an America's Cup event or selection series from the 34th America's Cup onwards.

40.4 The **Regatta Director** may require the **guest racer** to be tethered to the **yacht**.

40.5 The following rules pertaining to crew also apply to the **guest racer**:

(a) Rules 39.3, 39.7, and 39.8, relating to carried equipment;

(b) Rule 39.11 (b), relating to remaining in their **cockpit**; and

(c) Rule 39.13, relating to the limitation on time required to exit their **cockpit**;

41 Measurement

41.1 The **Measurement Procedures** shall be issued according to Rule 43.2.

41.2 The **Measurement Procedures** will specify measurement tolerances for quantities restricted or required by the **AC75 Class Rules** and the **AC75 Specification**, which shall relate to the accuracy of the measurement equipment. In some cases, **Competitors** may be required to meet a **Measurement Committee's** measurement exactly; in others, a measurement that falls within the equipment's measurement tolerance may be sufficient. For example:

(a) when first weighing a **platform** for an **AC75 event stage** the **Measurement Committee** may require the **platform** to be ballasted to meet its required mass exactly, as measured by their equipment; but

(b) on subsequent re-measurement, if no changes have been made by the **Competitor**, the **Measurement Committee** may require only that the **platform** matches its previously weighed mass within the tolerance of the measurement equipment.

41.3 **Competitors** shall permit the **Measurement Committee** to take samples of material from components of the **yacht** to ensure compliance with Rule 2.

41.4 **Competitors** shall permit the **Measurement Committee** to take samples of paint or plastic film from components of the **yacht** to ensure compliance with Rule 5.

41.5 **Competitors** shall assist the **Measurement Committee** in understanding the function and operation of mechanical, hydraulic and electrical systems onboard the **yacht**.

41.6 Compliance with **control system** rules may be determined by a combination of hardware inspection, code inspection, interviews and affidavits.

41.7 On request, **Competitors** shall provide the **Measurement Committee** with source code and compiled executables of any software installed on the **yacht** that the **Competitor** has access to, and shall assist them in the understanding of such code. However, **Competitors** shall not be restricted by the **Measurement Procedures** to using hardware or software that is easy to inspect: where full code inspection is impractical, some aspects of software compliance shall rely solely on interviews and affidavits.

41.8 The **Measurement Committee** shall issue a measurement certificate for a **yacht** when they have:

(a) concluded that she complies with the **AC75 Class Rules** and the **AC75 Specification**;

(b) received completed declarations and affidavits as required by the **AC75 Class Rules** and as additionally required by the **Measurement Committee** or the **Rules Committee** at their discretion;

(c) received all documentation as required by the **AC75 Class Rules** and by other notices published by the **Measurement Committee** or the **Rules Committee**, and confirmed that the documentation is satisfactory; and

(d) received the **yacht** configuration declaration required by Rule 42.2.

41.9 Once a measurement certificate has been issued, some changes to the **yacht** shall be permitted without requiring re-measurement. The scope of these permitted changes shall be detailed in the **Measurement Procedures** and shall include changes such as:

(a) routine maintenance on mechanical, hydraulic and electrical systems;

(b) changes to sensor calibrations; and

(c) changes to **ILS** and **CIS** software.

The **Measurement Committee** may further agree specifics of what can and cannot be changed without re-measurement with individual **Competitors**, based on the system design of their **yacht**. For example, classes of **ECC** settings that are incapable of affecting measurement compliance, such as soft pressure-relief valve setting and calibration of **passive input devices**, may be permitted changes. However, if there is any doubt, a **Competitor** is obliged to inform the **Measurement Committee** of any changes that have been made.

41.10 Aside from changes permitted without re-measurement, the configuration of a **yacht** with respect to other design details not recorded on her measurement certificate may be changed provided the **Measurement Committee** is able to verify compliance of those changes with respect to the **AC75 Class Rules** prior to racing. The **Measurement Procedures** shall include details of time scales required for re-measurement, which shall vary according to the part of the **yacht** being changed and checked, but will include provisions such as:

(a) verification of a **yacht assembly** mass and **longitudinal** centre of mass, which is likely to be checked the morning of a race; and

(b) a deadline prior to a race for the measurement of any **mainsails** or **jibs**, or any permitted modifications of sails, with a permission that a **Competitor** may select which pre-measured sail configurations to use for a race at any time up to the warning signal of that race.

A **Competitor** shall ensure that the **Measurement Committee** is available and has sufficient time to re-measure their **yacht** before making any such change.

42 Yacht configuration

42.1 The *declaration deadline* for an **AC75 event stage** shall be 120 hours before the scheduled start of the first race of that **AC75 event stage**.

42.2 Prior to the *declaration deadline*, **Competitors** shall declare confidentially to the **Measurement Committee**:

(a) the **yacht** configuration to be sailed in; and

(b) a component *substitution schedule*;

for the **AC75 event stage**.

42.3 The declared **yacht** configuration must include:

(a) the declared component ID, version and **blueprint SHAs** of the:

(i) **hull**;

(ii) **foil arm stocks**, **foil wings**, and **foil flaps**;

(iii) **rudder**;

(b) the declared component ID and version of the **mast tube**; and

(c) IGES files and corresponding **SHAs** of the port and starboard **linear components** that each combine a **foil arm stock**, **foil arm fairing** and **foil wing**.

42.4 The *substitution schedule* details the order of replacement components to be substituted in the event of loss or damage to a declared component, part of a component, or an associated system. A **Competitor's** *substitution schedule* shall remain confidential between that **Competitor** and the **Measurement Committee**. The *substitution schedule* may specify that:

(a) damage to some subcomponents of a **foil** may necessitate replacement of the other components of a **foil**, but damage to one **foil** shall not correspond to replacement of the other **foil**;

(b) damage to a **foil** system may necessitate replacement of a **foil**, or parts of that **foil**;

(c) damage to parts of a **mast** may necessitate replacement of a **mast tube**; and

(d) damage to specific parts of a component may necessitate changing to a different version of the same component, for example:

(i) a declared **yacht** configuration specifies **rudder** 2 version C;

(ii) the *substitution schedule* states that if **rudder** 2 version C is damaged only in the area of the "elevator" (which is defined by a drawing supplied by the **Competitor**), the component is to be replaced by **rudder** 2 version B;

(iii) the *substitution schedule* states that if **rudder** 2 version C is damaged elsewhere, the component is to be replaced by **rudder** 1 version D;

(iv) regardless of where the damage occurs, **rudder** 2 version C shall be reinstated on the **yacht** if and when it is repaired.

42.5 A **yacht's** measurement certificate shall be the form provided in Figure 42.1 with all fields completed. The information on a measurement certificate shall correspond to the declared **yacht** configuration.

42.6 Once a measurement certificate has been issued to a **Competitor** for the **AC75 event stage**, it shall not be amended or replaced at any time after that **AC75 event stage's** declaration deadline, unless:

(a) a component listed on the certificate is damaged or lost and the conditions in Rule 42.7 are met;

(b) a **Competitor** is permitted to change a component according to Rule 42.8; or

(c) the original certificate is withdrawn and is subsequently re-instated according to procedures in the "Non-compliance with the Class Rules" section of the **AC Technical Regulations**.

42.7 In the event of damage or loss to a component listed on the measurement certificate, a new measurement certificate shall only be issued subject to the following conditions:

(a) the **Measurement Committee** must be completely satisfied that the damage or loss was unintentional, and that a repair in accordance with the **AC Technical Regulations** is not possible in time for the **Competitor's** next race. The **Measurement Committee** may request sailing data, video, inspection of components, interviews with or affidavits from team members to confirm this;

(b) if the **Measurement Committee** permits a component to be replaced, it shall only be replaced with the next component identified on the *substitution schedule*;

(c) if a damaged component is replaced, and that component can be repaired, but not in time for the next race, the **Competitor** shall submit to the **Measurement Committee** an estimated repair schedule and must repair the component as quickly as possible. As soon as the component is repaired, it must be reinstalled, and the original measurement certificate shall be reinstated.

42.8 With reference to Rule 42.7, if:

(a) the damage occurs in an **AC75 event stage** in which the *damaged* ***Competitor*** is racing only one other **Competitor** (not, for example, a fleet race or round-robin stage);

(b) the **Measurement Committee** permits the *damaged* **Competitor** to replace a damaged component and issues a new measurement certificate; and

(c) the damage is not ruled, by the Umpires or **Jury**, to have been caused through the fault of the other **Competitor**; then

the other **Competitor** competing in the **AC75 event stage** shall also be entitled, if they choose, to change the corresponding component to the next component identified on its *substitution schedule*, and a new measurement certificate shall be issued.

In this event, when the *damaged* ***Competitor*** reinstates that repaired component, the **Measurement Committee** shall inform the other **Competitor**, who can then choose whether to reinstate its original component. This choice to reinstate a component, or not, shall only be available at the time that, and if the **Competitor** chooses to re-instate, they shall be required to make the change at the next available opportunity, taking into account the racing schedule and the time required to make the change.

42.9 If a **yacht's** measurement certificate is withdrawn according to procedures in the "Class Rule infringements during an Event" section of the **AC Technical Regulations**, and the **Measurement Committee** determines that a declared component that has previously been measured as Rule-compliant is no longer Rule-compliant, the **Regatta Director** in consultation with the **Measurement Committee** may permit a **Competitor** to:

(a) declare a new **yacht** configuration that specifies a different component;

(b) declare a new version of that component, and declare a new **yacht** configuration that specifies that new component version; or

(c) declare a new **yacht** configuration that specifies a different, previously declared version of that component;

provided that the change to the **yacht** configuration is the minimum change required to allow the **yacht** to become Rule-compliant, subject to Rule 42.10.

42.10 The decision as to which of the options within Rule 42.9 is permitted shall be taken by the **Regatta Director** in consultation with the **Measurement Committee** and the affected **Competitor**. The option chosen shall be the one which, out of those that are achievable within a practical time-frame, will make the least difference to the performance of the **yacht**. For example:

(a) if a change can be made to modify a declared component to a new configuration, and that change will have less performance impact (positive or negative) than changing to a different component or previous version of a component, that option shall be chosen; but

(b) if the component cannot be readily made Rule-compliant, the component shall be changed to a different component.

42.11 With reference to Rule 42.9, the **Regatta Director** may also permit one option as a temporary solution (e.g. switch of a component to another component), to be followed by another option (e.g. modification of the original component) when there has been sufficient time for that option to be implemented. Such a permission shall only be granted if the **Regatta Director** is satisfied that the **Competitor** can gain no advantage by means of using the temporary option over their original configuration.

42.12 Where a **Competitor** is permitted to declare a new **yacht** configuration according to Rule 42.9, the **Regatta Director** in consultation with the **Measurement Committee** may also permit changes to be made to the component substitution schedule, provided:

(a) they relate only to the changes in the declared **yacht** configuration; and

(b) any change to the component substitution schedule is the minimum change required to be compatible with the change to the declared **yacht** configuration.

42.13 When racing, the configuration of a **yacht** must match the configuration recorded in her measurement certificate, except:

(a) for a change in measurement **yacht assembly longitudinal** centre of mass x_Y, of up to ± 25 mm from the recorded value.

(b) where a specific exemption is granted according to procedures within the **AC Technical Regulations** relating to damage to the **yacht**.

38th America's Cup

AC75 CLASS MEASUREMENT CERTIFICATE

Competitor

Team

Yacht club

Certificate

Certificate number

Supersedes number

Date

Mass

Yacht assembly mass *kg*

Longitudinal centre *m*

Hull

Name

ID | *Version*

SHA

Mast

ID | *Version*

Rudder

ID | *Version*

SHA

Port foil

Foil arm stock

ID | *Version*

SHA

Foil wing

ID | *Version*

SHA

Foil flap

ID | *Version*

SHA

Linear component

IGES filename

SHA

Starboard foil

Foil arm stock

ID | *Version*

SHA

Foil wing

ID | *Version*

SHA

Foil flap

ID | *Version*

SHA

Linear component

IGES filename

SHA

Measurers

Measured and found to comply with the AC75 Class Rule:

Name | *Name*

Signature | *Signature*

Figure 42.1: Measurement certificate

43 Documents

43.1 The following documents shall be published in the **Official Repo**:

(a) the list of approved **commercial products**, including the initial list, referred to in Rule 4.2;

(b) the **Measurement Procedures**; and

(c) the specifications listed in Rules 43.3 and 43.4, including any supporting or clarifying documents.

43.2 The **Measurement Committee**, in consultation with the **Rules Committee** will issue the **Measurement Procedures** on or before a date TBA, and may amend them at any time.

43.3 **COR/D** will issue the following specifications and software on or before the dates specified:

Component	Release	Rule	Date
Foil arm stock	Specification	13	2025-09-16
Mast	Specification	17.1	2025-09-16
FCS & **FoilCantECC**	Specification	32.1	2025-09-16
FoilCantECC	Software	32.1	ACP+7
TRACI	Specification	36	2025-09-16
TRACI	Software	36	ACP+7

43.4 **ACP** will issue the following specifications and software on or before the dates specified:

Component	Release	Rule	Date
Battery unit	Specification	23.2	TBA
RigEPS	Specification	29.1	TBA
RigEPS	Software	29.1	TBA
CAN bridge	Specification	25.5	TBA
Media System	Specification	35	TBA
Media equipment	Specification	37	TBA
Guest racer seating module	Specification	11.11	TBA
Event branding	Specification	38	TBA

43.5 Each specification listed in Rules 43.3 and 43.4 shall contain a master document listing which other documents comprise the full specification.

43.6 Software issued by **COR/D** will initially be published as executables only; source code will be published following the formation of **ACP**. Software issued by **ACP** will be published as executables with source code.

43.7 The dates in this section marked as:

(a) "ACP+7" will be 7 days after the formation of **ACP**; and

(b) "TBA" will be advised by **ACP**.

44 Agreement

44.1 **COR/D** agreed to the publication of version V3.01 of these **AC75 Class Rules** on the 9th day of September 2025.

Team New Zealand Ltd	
Name Dan Bernasconi	Signature 
Date 09/09/2025	

Athena Racing Ltd	
Name Nick Holroyd	Signature 
Date 09/09/2025	